MODULE DESCRIPTION FORM

Signature:

Head of Department Name:
Prof. Dr. Amjed A. Mohammed
6/5/2025 Date:

Department of Quality Assurance and University Performance
Director of the Quality Assurance and University Performance Department:
Date: 8/5/2025
Signature:
Muthaffar Siddeeq Abdul Karoum

Module Information					
Module Title	**General Zoology**			**Module Delivery**	
Module Type	**Core**			☒Theory Lecture ☒ ☒Lab Tutorial ☐ ☐Practical ☐Seminar	
Module Code	**Bio-1101**				
ECTS Credits	**8**				
SWL (hr/sem)	**200**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. Firas Hameed		**e-mail**	firaskhathayer@gmail.com	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Abeer Attaala		**e-mail**	abesbio53@uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**Version Number**	1.0	

Relation with other Modules			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	This study aims 1. Introduction of information about laboratory safety 2. Tools and machines example microscope 3. Cell measurement 4. Animal taxonomy 5. Introduction of cell, types of cell ,structure of cell 6. Animal tissues 7. Animal anatomy 8. Types of cell division
Module Learning Outcomes	The students learn how to use the microscope and exam the slides and how to find the measurement of cell 2. The students know the type of cell and how distinguish between two types of cells and know the higher structure of cell organs. 3. the students can distinguish between types of tissues and and know the function & site & types of cell for each tissue 4. the students know cell cycle and can distinguish between two types of cell division. and when occurs each type
Indicative Contents	Indicative content includes the following. <u>Part A – Theoretical lectures</u> Introduction to zoology and other biological science. Branches of Zoology. Characteristics of living things .Structure and Function of Cells. Theory of the cells [*10* hrs] Basics nutrition, Classification of carbohydrates,. lipids and proteins. Cell cycle. Phases of cell cycle. Classification of Animal kingdom.[*18*hrs] Physiology of Digestion system. Functions of the Digestive System. Nervous Regulation of the Digestive System. Function of Stomach. Regulation of Gastric Secretion. Pancreas. Gall Bladder. Small Intestine. Large intestine. Classification of Animal kingdom.. Parazoa. Porifera [18hrs] Eumetazoa.Cnidaria, Platyhelminthes .Nematoda, Mollusca [3 hrs] <u>Part B – Practical labs</u> General safety instructions in the laboratory..Tools and machines example microscope..Cell measurement.Introduction of cell, types of cell ,structure of cell. Animal taxonomy. Animal tissues [18 hrs] Animal tissues.Types of cell division.[18 hrs

Learning and Teaching Strategies	
Strategies	Expanding students' perceptions about this science and its contents . Various techniques were used such as. Data show , Microscope, Posters . Students do study the following fields: An introduction to the study of Physiology of the body. Definition of body systems and understands how this system work under normal conditions. Definition of the techniques uses to estimation of body parameters. Study the disorders of this systems physiology and study the diseases results from disorders in homeostats. The relationships between the different body systems. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	108	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	92	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**200**		

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

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction to zoology and other biological science
Week 2	Branches of Zoology Characteristics of living things
Week 3	Structure and Function of Cells
Week 4	Theory of the cells
Week 5	Basics nutrition, Classification of carbohydrates,
Week 6	lipids and proteins
Week 7	Cell cycle
Week 8	Phases of cell cycle
Week 9	Classification of Animal kingdom
Week 10	Classification of Animal kingdom
Week 11	Parazoa
Week 12	Porifera
Week 13	Eumetazoa
Week 14	Cnidaria, Platyhelminthes
Week 15	, Nematoda, Mollusca

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: General safety instructions in the laboratory.
Week 2	Lab 2: Tools and machines example microscope.
Week 3	Lab 3: Cell measurement

Week 4	Lab 4: Introduction of cell, types of cell ,structure of cell
Week 5	Lab 5: Introduction of cell, types of cell ,structure of cell
Week 6	Lab 6: Animal taxonomy
Week 7	Lab 7: Animal taxonomy
Week 8	Lab 8: Animal taxonomy
Week 9	Lab9: Animal tissues
Week10	Lab 10: Animal tissues
Week 11	Lab 11: Animal tissues
Week 12	Lab 12: Animal tissues
Week 13	Lab 13: Animal tissues
Week 14	Lab 14: Types of cell division
Week 15	Lab 15: Types of cell division

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Guyton, A. and Hall, J.E. (2016). "Text book of physiology". 11th ed. Elsevier Saunders. China.** **Barrett, K.; brooks, H.; Boitano, S. and Barman, S. (2010). "Ganong's eview of Medical Physiology". 23 th edition. McGraw Hill Companies. New York**	Yes Yes
Recommended Texts	**Ghia, CL. (2013). A Textbook of Practical Physiology. Jaypee Brothers Medical Publishers (P) Ltd.; 8th edition.**	no
Websites	https://www.nature.com/subjects/animal-physiology https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/animal-physiology	

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

Module Information معلومات المادة الدراسية					
Module Title	**Analytical Chemistry**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Bio-1102**				
ECTS Credits	8				
SWL (hr/sem)	**200**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Bio		**College**	Sci	
Module Leader	Hiba Abed Salam Mohammed		**e-mail**	hibaabed34@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Eman Bahjat basheer and Sahbaa Younis majeed		**e-mail**	emanbahjat@uomosul.edu.iq	
Peer Reviewer Name	Prof.Dr. Nabeel Othman		**e-mail**	Sahbaayounis@uomosul.edu.iq	
Scientific Committee Approval Date	1/10/2024		**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 Objectives أهداف المادة الدراسية	1.Students will understand the structures and purposes of basic components of analytical chemistry 2. Students will understand how these cellular components are used to generate and utilize energy in cells 3. Students will understand the cellular components underlying mitotic cell division. 4.Students will apply their knowledge of cell biology to selected examples of changes or losses in cell function. These can include responses to environmental or physiological changes, or alterations of cell function brought about by mutation .
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	-Explain the basic structure of cells -Identify the function and organization of the various organelles in eukaryotic cells - Describe intracellular trafficking of macromolecules Discuss endocytosis and exocytosis - Describe compartmentalization of cells, structure and function of cell organelles, the cytoskeleton ,transport across cell membranes. - Discuss key biological processes in cells and their regulation - Evaluate the important biological processes in cells. - Conduct laboratory practicals, collect data, interpret and discuss results. - Utilize immune fluorescence microscopy for monitoring sub cellular trafficking of proteins
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Introduction of cell biology, define of the analytical chemistry function of analytical chemistry , analytical chemistry theory, protoplasm theory .Types of analytical chemistry. The chemistry of the analytical chemistry . Part B – Practical labs Qualitative analysis , Quantitative analysis ,Gravimetric analysis Volumetric analysis

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Competitive Learning • Students work individually. • Students have common learning goals and tasks. • The instructor grades students using norm-referenced methods (e.g., curve-based grading). Individualistic Learning • Students work individually. • Students have individualized learning goals and tasks, different from those of other students. • The instructor grades students using criteria-referenced methods (e.g., rubric-based grading). Cooperative Learning • Students work in small groups. • Students have shared learning goals and tasks within a group which may be similar or different from other groups. • The instructor grades students both on their work as a group and on their individual work.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	108	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	92	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**200**		

Module Evaluation

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

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction of analytical chemistry, define of the analytical chemistry, function of analytical chemistry, analytical chemistry theory, protoplasm theory .
Week 2	Types of analytical chemistry
Week 3	Qualitative analysis
Week4	Quantitative analysis
Week 5	The chemistry of the analytical chemistry
Week6	Gravimetric analysis
Week 7	Volumetric analysis
Week 8	Electrolytes
Week 9	Strong electrolyte.
Week 10	Weak electrolyte.
Week 11	Acid Base Theories .
Week 12	Methods for Expressing Concentrations
Week 13	Mole fraction.
Week 14	Convert Units.
Week 15	Calculating pH of Strong Acid and Base Solutions

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered

Week 1	Lab 1:.
Week 2	Lab 2:.
Week 3	Lab 3:
Week 4	Lab 4:.
Week 5	Lab 5:
Week 6	Lab 6:
Week 7	Lab 7:
Week 8	Lab 8:
Week 9	Lab9:
Week10	Lab 10:.
Week 11	Lab 11:
Week 12	Lab 12:

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Harris, Daniel C., 1948- (29 May 2015). *Quantitative chemical analysis*. Lucy, Charles A. (9th ed.). New York. ISBN 978-1-4641-3538-5. OCLC 915084423	No
	Groth, P.; Cox, J. (2017). "Indicators for the use of robotic labs in basic biomedical research: A literature analysis". *PeerJ*. **5**: e3997. doi:10.7717/peerj.3997. PMC 5681851. PMID 29134146	No
	Skoog, Douglas A.; West, Donald M.; Holler, F. James; Crouch, Stanley R. (2014). *Fundamentals of Analytical Chemistry*. Belmont: Brooks/Cole, Cengage Learning. p. 1. ISBN 978-0-495-55832-3.	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)	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

Module Information معلومات المادة الدراسية					
Module Title	**Mathematics**			**Module Delivery**	
Module Type	**Basic**			☒**Theory** ☐**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**Sci-101**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	**Bio.**		**College**	**Sci.**	
Module Leader	Areen Abdullah Salih		**e-mail**	areen.saleh@uomosul.edu.iq	
Module Leader's Acad. Title	**Assistant Lecturer**		**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	**1/10/2024**		**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 Objectives أهداف المادة الدراسية	This course aims to enable students to: - 1. Acquire the necessary mathematical concepts for everyday life, and for continuous learning mathematics and related disciplines. 2. Develop the necessary process skills for the acquisition and application of mathematical concepts and skills. 3. Developing the potential of the student to use mathematics in practical application and benefit from lessons in others. 4. Show the importance of calculus in science. 5. Provide the basic principles of calculus and its applications to improve the student's logical thinking and mathematical skills to solve mathematical problems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Student will develop a conceptual understanding of limit, continuity, differentiation, and integration as well as a thorough background in techniques of calculus. The trainee will be able to do following: 1. To solve mathematics problems with trigonometric function. 2. Students will analysis relationships among quantities including functions, ways of representing mathematical relationships, and the analysis of change. 3. Drive and integrate functions.
Indicative Contents المحتويات الإرشادية	• Mathematics is often called the '' Queen of Science '' because an understanding of mathematics is essential to an understanding of all the other sciences. • Calculus is the mathematics of change, of calculating problems that are continually evolving. There are two primary Branches of calculus: differential calculus and integral calculus. • A broad overview of the subject, included primary for liberal art students. What do mathematicians do, and why do they do it? • This course is vitally important as it has a plenty of applications in many fields. • This course is much interconnected with other courses. • The course covers major principal areas of mathematical. • With studying this course, students get an enough knowledge which might enable them to deal with the most mathematical problems they may encounter during their teaching process as well as during the employment methods.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 by Using appropriate teaching strategies and methods and teaching aids to develop thinking skills.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**50**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative	**Quizzes**	2	10% (10)	5 and 10	All

assessment	**Assignments**	2	10% (10)	2 and 12	All
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	All
Summative assessment	**Midterm Exam**	2hr	20% (10)	7	All
	Final Exam	3	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	• Introduction of Real number Natural numbers, Integer numbers, Rational numbers, Irrational numbers, Imaginary numbers, Complex numbers, Absolute value.
Week 2	• Function, Domain and Range of Functions. Polynomial Function, Roots Function, Quotient Functions. • Operation of Functions. The Sum, Difference, Product, Quotient and composite of Functions. • Invers of Functions, Domain and Range of Inverse. • Special Functions. Constant Function, Identity Function, The Liner Function, The Polynomial Function, Quadratic Function, The Rational Function, Rooted Function, The absolute value Function.
Week 3	• Horizontal and Vertical Lines. • Distances between Points and Lines. • Increasing and Decreasing Functions. Slope.
Week 4	• Concepts of Limits. • Properties of Limits. Right hand and lift hand of Limits.
Week 5	Quiz1
Week 6	The Derivatives of Functions.

Week 7	• Differentiable on a closed interval –one – sides Derivative. Differentiation Rules.
Week 8	• The chain Rule. Implicit Differentiation.
Week 9	• Indefinite Integration. Properties of Integrations.
Week 10	• Integral of Trigonometric Functions. The Definite Integral.
Week 11	Quiz 2
Week 12	• Definition of Natural Logarithm. Ln as inverse function of exponential function.
Week 13	Natural Logarithm rules and Properties.
Week 14	Midterm Exam
Week 15	• Definition of Matrix. • Operation of Matrix.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Lab 1	
Lab 2	
Lab 3	
Lab4	
Lab 5	
Lab 6	
Lab 7	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Thomas G. B., 2008, Calculus, 11th ed., Inc	Yes

Recommended Texts	1- Thomas G. B., 2010, Calculus, 12th ed., Inc 2- Donald A., 2003, Mathematical Methods for Scientists and Engineers, McQuarrie.	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
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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

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MODULE DESCRIPTION FORM

Module Information معلومات المادة الدراسية					
Module Title	Biophysics			**Module Delivery**	
Module Type	core			☒Theory ☒Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	Bio-1103				
ECTS Credits	**8**				
SWL (hr/sem)	**200**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Bio		**College**	Sci	
Module Leader	Khodor Ali Saleh		**e-mail**		
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**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 Objectives أهداف المادة الدراسية	1- Introduce students to the importance of general principles in physics by explaining (The SI Units, Quantities, Displacement, Distance, Scalar & Vector Quantities, Motion, Velocity, Speed, Acceleration, Kinematic equations, a Freely Falling Body, Projectile Motion, laws of Newton's of motion, and Friction, nature of light, physical optics, reflection and refraction). 2- Enabling students to distinguish between Vectors quantities and Scalar quantities and the motion of the body at constant Velocity and constant Acceleration with Kinematic equations, Freely falling body, Projectile Motion, Newton's Laws of Motion, and Friction and light laws. 3- Develop students' knowledge about the most important mechanics in (Scalar & Vector quantities, Displacement, Distance, Velocity, Acceleration, Kinematic equation, the Freely Falling body, Projectile motion, Newton's Laws of Motion, and Friction). 4- Accustom students to linking the theoretical side of the module with the daily practical life of the student, by giving him examples related to ordinary life. 5- Study the (Scalar quantities & Vector quantities) properties by studying the sum, subtract, Scalar product & Vector product. 6- Study the Displacement, and (Motion of the body) at constant Velocity & acceleration, and the Kinematic equations. 7-Enabling the student to know the basic concepts of a Freely Falling body, Projectile Motion, Newton's Laws of Motion, and Friction. 8- Overall, the aim of a module is to provide students with powerful tools for understanding and analyzing Classical Mechanics properties.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1-Properties of Mechanics: Mechanics are classified into Two important essential branches which are namely kinematics and Dynamics. 2- Kinematic: This is the branch of mechanics that studies the motion of a body without regard to the cause of that motion. which include the study of average velocity and a constant velocity of a moving body, average acceleration and constant acceleration of a moving body, Instantaneous velocity, and instantaneous acceleration of a moving body. 3- The Three Kinematic equations of motion which describe the motion of body with initial velocity and final velocity, instant of time (t), displacement, and acceleration of a moving body. 4- The Freely Falling Body: which describe the body that is moving freely under the influence of gravity, where it is assumed that the effect of air is negligible. 5- Projectile Motion: which describe of an object is simple to analyze if we make two assumption: (1) the free-fall acceleration is constant over the range of motion and is directed downward, and (2) the effect of air resistance is negligible, and study Horizontal Range, Maximum Height of Projectile and time of flight of the projectile. 6- Dynamic: is the branch of mechanics concerned with the forces that change or produce the motion of bodies. the foundation of dynamics is Newton's Laws of motion (First, Second and Third Law). Another type of Dynamic is the Friction which is divided in two type the first is (Force of Static Friction) and the second is the (Force of Kinetic Friction).

	7- Introduction to properties of light. 8- Types of reflection: External reflection: This happens when it is (n>1), that is, when the light falls from the medium of the lowest light density to the medium of the highest light density (for example, "when light falls from the air towards the water). Internal reflection: This happens when it is (n<1), that is, when light falls from the medium with the highest light density to the medium with the lowest light density (from glass to the air).
Indicative Contents المحتويات الإرشادية	This course introduces the use of Chemical, physical methods in the study of biological systems: Scope of Biophysics, Fundamentals of Biophysics, interaction of light With matter, ChemicalForces, Diffusion and Brownian motion, Viscosity, Light Scattering Small - Molecule Solutes:hydrophiles, hydrophobes, large Hydrophobic Solutes and Surfacec, Aqueous Environment of theCell, State of Water in bio-structures & its significance, phsico Chemical Techniques to StudyBiophsics (Introduction, Physical Aspects, of Hearing) (The Ear, Elementary acoustics, Theories ofhearing), Optical defects of the eye, Neural aspects of Vision, Chemical equilibriums in biologicalsystems, Bioenergy

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Conceptual Understanding: Start by providing an overview of nature of the light, and Help students understand how this principles and methods are used to analyze and interpret data in these areas. Use real-world examples and case studies to illustrate the significance of optics techniques. Problem-Solving Practice: Include problem-solving activities and assignments that require students to apply this theory to practical scenarios. Present them with real or simulated data and challenge them to analyze and interpret the information using appropriate optics techniques. This will develop their problem-solving skills and reinforce their understanding of the subject matter. Supplemental Resources: Recommend supplementary resources such as textbooks, research articles. Encourage students to explore these resources to gain a deeper understanding of the subject matter. Provide a curated list of recommended readings and online tools to support their learning. Assessment and Feedback: Regularly assess students' understanding through quizzes, tests, or projects. Provide constructive feedback to guide their learning and address any misconceptions. Consider incorporating formative assessments to gauge understanding before major evaluations, allowing for timely intervention and support. Collaboration and Discussion: Foster collaboration among students by organizing group discussions, case studies, or problem-solving sessions. Encourage them to share their perspectives, ideas, and experiences related to nature of the light. This collaborative environment promotes active learning, critical thinking, and knowledge sharing.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	108	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	92	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**200**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	10% (10)	4, 10 and 15	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	1hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Scope of Biophysics, Fundamentals of Biophysics.
Week 2	Interaction of light With matter.
Week 3	Chemical Forces.

Week 4	Discussion and Quiz
Week 5	Diffusion and Brownian motion, Viscosity.
Week 6	Light Scattering Small - Molecule Solutes:hydrophiles, hydrophobes, large Hydrophobic Solutes and Surfacec.
Week 7	Aqueous Environment of theCell, State of Water in bio-structures & its significance.
Week 8	phsico Chemical Techniques to StudyBiophsics (Introduction, Physical Aspects, of Hearing).
Week 9	The Ear, Elementary acoustics, Theories ofhearing.
Week 10	Discussion and Quiz
Week 11	Optical defects of the eye.
Week 12	Neural aspects of Vision.
Week 13	Chemical equilibriums in biological systems.
Week 14	Bioenergy.
Week 15	Discussion and Quiz

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	The acceleration of free fall by means of the simple pendulum.
Week 2	The velocity of sound.
Week 3	Ohms law.
Week 4	The focal length of mirrors.
Week 5	The refraction of light.
Week 6	The focal length of lenses.
Week 7	The coefficient of 1)static and 2)dynamic friction for wood on wood.
Week 8	The specific weight of solid body and liquid
Week 9	Determined the frequency of a tuning fork by means of a sonometer
Week10	Quiz
Week 11	
Week 12	

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1. Physics for Scientists and Engineers with modern physics/ Douglas C. Giancoli (2009). 2. Physics for Scientists and Engineers with modern physics/ Raymond A. Serway and John W. Jewett, Jr. (2016). 3. Physics part 1/ Jearl Walker. (2010). 4. Practical physics in (SI) BY E.Armitage.	
Recommended Texts	1. **fundamentals of Physics, 8th edition, by** Jearl Walker . 2. Fundamentals of College Physics Updated Fifth Edition Volume I: Mechanics, Vibratory Motion, Wave Motion, Fluids, and Thermodynamics Dr. Peter J. Nolan. 3. College physics by serway.	
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

Module Information معلومات المادة الدراسية					
Module Title	**Democracy and Human Rights**			**Module Delivery**	
Module Type	**Basic**			☒**Theory** ☒**Lecture** ☐ **Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**UOM104**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level	**1**		**Semester of Delivery**	1	
Administering Department	**Bio**		**College**	**Sci**	
Module Leader	م.م.غفران يونس حسين		**e-mail**	GufranYounus.Hussien@uomosul.edu.iq	
Module Leader's Acad. Title	lecturer		**Module Leader's Qualification**	**M.Sc**	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	**1/10/2024**		**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 Objectives أهداف المادة الدراسية	يهدف المَقرر بأَنَّ يكون الطالب مُلِماً بمفاهيم العلوم السياسية والتعرف على مبادئ علم السياسة . تقديم فهم علمي متوازن لأسُس حقوق الانسان بطريقة مُبسطة ومفهومة لأَغلب المُفردات والمواضيع التي تهم الطالب والتي تدخل ضمن تخصُصات مرحلة الأَولية الجامعية في العلوم السياسية، ساعين لفهم وإدراك أَفضل للمقومات والمبادئ الأَولية للدِراسات السياسية في إطار النظرية السياسية. السعي لبلورة التفكير الإبداعي لدى الطالب والتي تركز على القدرة على استِدعاء معلومات أو خبرات تكون مُخزنة بعقله وطرح بدائل سريعة، وكذلك السعي لبلورة التفكير المعرفي لديه. أَنَّ يكون مُتمكِناً مِن تشخيص كُل مُفردة أَو مادة علمية وتوظيفها في دِراسته أَو مجال عمله مُستقبلاً. تنمية مهارات الطالب في التحليل الاجتماعي والسياسي. التقريب ما بين الدِراسة النظرية والواقع الراهن. توسيع مدارك طالب العلوم السياسية في التفريق بين المفاهيم السياسية. The course aims to provide students with a solid understanding of political science concepts and political science principles. To provide a balanced scientific understanding of the foundations of human rights in a simplified and understandable manner, covering most of the terms and topics of interest to students and which fall within the specializations of the undergraduate political science program. The course seeks to better understand and grasp the fundamental principles and foundations of political studies within the framework of political theory. To develop students' creative thinking, focusing on their ability to recall stored information or experiences and propose quick alternatives, as well as to develop their cognitive thinking. To enable them to identify each term or scientific material and apply it to their studies or future field of work. To develop students' skills in social and political analysis. To bridge theoretical studies with current reality. To broaden students' understanding of the distinction between political concepts.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**أ- المعرفة والفهم** 1- أَنَّ يكون الطالب مُلِماً بمفاهيم ومُصطلحات العلوم السياسية. 2- أَنَّ يكون قادِراً على تحليل مُفردات العلوم السياسية باستخدام المناهج المُتخصِصة. 3- أَنَّ يكون قادراً على تمييز ماهية العوامل التي تؤَثر في سياسات الدولة داخلياً وخارجياً. 4- أَنَّ يكون قادراً على تحديد ماهية المفاهيم والمُصطلحات السياسية ومعرفة العلاقة الترابطية بين حقوق الانسان ببقية العلوم الاخرى. 5- أَنَّ يكون مُتمكِناً مِن تشخيص كُل مُفردة أَو مادة علمية وتوظيفها في دِراسته أَو مجال عمله مُستقبلاً. 6- أَنَّ يتمكن من فهم أَسُس حقوق الانسان. A- Knowledge and Understanding 1- The student must be familiar with the concepts and terminology of political science. 2- The student must be able to analyze political science vocabulary using specialized methods. 3- The student must be able to distinguish the factors that influence state policies,

	both domestically and internationally. 4- The student must be able to define political concepts and terminology and understand the interrelationship between human rights and other sciences. 5- The student must be able to identify each term or scientific subject and employ it in their studies or future field of work. .The student must be able to understand the foundations of human rights -6
Indicative Contents المحتويات الإرشادية	اكتساب الطالب لمهارات وقدرات التحليل المنطقي للتفاعُلات والمُتغيرات السياسية والاجتماعية الداخلية – واثرها على سياسة الدولة. 2– اكتساب الطالب لمهارات االتحليل العلمي. 3– القدرة على الجمع بين الذكاء والدِراسة والمُمارسة بغية الوصول إلى الأَكاديمي المُتخصص الذي يملك معرفة في العلوم السياسية، جنباً إلى جنب مع المعرفة بالمؤثرات الاجتماعية والاقتصادية والثقافية التي تؤثر في اتجاهات ومواقف الدولة والمجتمع The student acquires the skills and abilities to logically analyze internal political and social interactions and variables and their impact on state policy. 2. The student acquires scientific analysis skills. 3. The ability to combine intelligence, study, and practice to become a specialized academic who possesses knowledge of political science, along with knowledge of the social, economic, and cultural influences that affect the trends and positions of the state and society.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 by Using appropriate teaching strategies and methods and teaching aids to develop thinking skills.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2.2

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**50**		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	3	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	3	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	0		Continuous	All
	Report	1	20% (20)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	3hr	10% (10)	7	LO #1 - #7
	Final Exam	3	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered	
Week 1	حقوق الانسان وتطورها في التاريخ البشري	Human Rights and Their Development in Human History

Week 2	حقوق الانسان في العصور القديمة والوسيطة	Human Rights in Ancient and Medieval Times
Week 3	حقوق الانسان في التاريخ الحديث	Human Rights in Modern History
Week 4	حقوق الانسان (التحديد والتعريف والضمانات)	Human Rights (Definition, Definition, and Guarantees)
Week 5	العلاقة بين حقوق الانسان والحريات العامة	The Relationship Between Human Rights and Public Freedoms
Week 6	اشكال واصناف حقوق الانسان والترابط بينها	Forms and Types of Human Rights and the Interrelationship Between Them
Week 7	ضمانات الحريات العامة	Guarantees of Public Freedoms
Week 8	التقاضي والتظلم غير القضائي	Litigation and Non-Judicial Grievance
Week 9	الطعن القضائي	Judicial Appeal
Week 10	تحديد مسؤولية الدولة عن اعمالها الشرعية	Defining State Responsibility for Its Lawful Acts
Week 11	اثر ازدواجية القضاء على الحريات العامة	The Impact of Dual Judiciary on Public Freedoms
Week 12	مفهوم المساواة	The Concept of Equality
Week 13	التطور التاريخي لمفهوم المساواة	Historical Development of the Concept of Equality
Week 14	التطور الحديث لمفهوم المساواة	Historical Development of the Concept of Equality
Week 15	تعريف الحريات العامة وتطورها التاريخي	Guarantees of Public Freedoms

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
	يوجد كتاب منهجي مُحدد، وهو كتاب حقوق الانسان تأليف (د. حافظ علوان الدليمي) ولكن يتم الاعتماد على مصادر عديدة اخرى ذات صلة بالمقرر ومِن أهمها: 1. الديمقراطية وحقوق الانسان، محمد عابد الجابري 2. حقوق الانسان والديمقراطية والحريات العامة ، ماهر صبري كاظم 3. حقوق الانسان تطورها مضامينها حمايتها ، رياض عزيز هادي مصادر حديثة كتب وبحوث ومقالات مأخوذة من شبكة المعلومات الدولية (الانترنت) There is a specific curriculum book, Human Rights, by Dr. Hafez Alwan Al-Dulaimi. However, we rely on numerous other sources relevant to the course, the most important of which are: 1. Democracy and Human Rights, by Muhammad Abed Al-Jabri 2. Human Rights, Democracy, and Public Freedoms, by Maher Sabri Kazim 3. Human Rights: Their Development, Content, and Protection, by Riyad Aziz Hadi Recent sources: Books, research, and articles taken from the Internet	
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group	**A -** Excellent	امتياز	90 - 100	Outstanding Performance

(50 - 100)	**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	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
(0 – 49)	**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

Module Information معلومات المادة الدراسية					
Module Title	**Arabic Language1**			**Module Delivery**	
Module Type	**Basic**			☒**Theory** ☒**Lecture** ☐ **Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**UOM101**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level	**1**		**Semester of Delivery**	1	
Administering Department	**Bio**		**College**	**Sci**	
Module Leader	**د. امية غانم ايوب**		**e-mail**	Umayah .g.a@uomosul.edu.iq	
Module Leader's Acad. Title	lecturer		**Module Leader's Qualification**	**M.Sc**	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	**1/10/2024**		**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 Objectives أهداف المادة الدراسية	تعريف الطلاب بأساسيات اللغة العربية .كذلك كسر حاجز الخجل وزيادة ثقتهم داخل وخارج الفصل. هناك فرصة كبيرة لإشر اكهم في مناقشات قصيرة حيث يمكنهم الكتابة أو التعبير عن أنفسهم شفهيًا. بالإضافة إلى ما سبق ، ستعمل المادة على تحسين مها ا رت القر ا ءة والكتابة والاستماع والتحدث كطلاب وتقوية ملكة الطلاب الأدبية لتذوق أساليب اللغة وإد ا رك مواطن الجمال فيها Introducing students to the basics of the Arabic language. It also breaks down shyness and increases their confidence both inside and outside the classroom. There is ample opportunity to engage them in short discussions where they can write or express themselves orally. In addition, the course will enhance students' reading, writing, listening, and speaking skills, and strengthen their literary ability to appreciate the language styles and recognize its beauty.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1-خلق وعي كامل بالاستخدام الصحيح لقواعد اللغة العربية في الكتابة والمحادثة. - 2إد ا رك أهمية اللغة العربية داخل وخارج الحياة الجامعية. - 3سيحسن الطلاب قدرتهم على التحدث باللغة العربية من حيث الطلاقة والاستيعاب. - 4سيقوم الطلاب بم ا رجعة الأشكال النحوية للغة العربية واستخدام هذه الأشكال في سياقات تواصلية محددة ، والتي تشمل :الأنشطة الصفية ، والواجبات المنزلية ، وق ا رءة النصوص ، والكتابة. - 5سيعزز الطلاب قدرتهم على كتابة فق ا رت قصيرة وملخصات باستخدام نهج العملية. Develop a full awareness of the correct use of Arabic grammar in writing and conversation. 2. Recognize the importance of the Arabic language both inside and outside of university life. 3. Students will improve their ability to speak Arabic in terms of fluency and comprehension. 4. Students will review the grammatical forms of Arabic and use these forms in specific communicative contexts, including classroom activities, homework, reading texts, and writing. 5. Students will enhance their ability to write short paragraphs and summaries using a process approach.
Indicative Contents المحتويات الإرشادية	مقدمة عن الاتصال بشكل عام واللغة العربية بشكل خاص ، مع مقدمة عن فئات الكلمات)أج ا زء الكلام(في اللغة العربية] 4 ساعات[. شرح كل جزء من الكلام في اللغة العربية مثل الأسماء والضمائر والأفعال والصفات والظروف وحروف الجر وحروف العطف والاقت ا رن] 16 ساعة[. المها ا رت الأساسية في تعلم اللغة الإنجليزية: الق ا رءة والكتابة يتم تقديمها بشكل تدريجي خلال الأسابيع الماضية] 6 ساعات[. الجزء الأخير مخصص لبعض جلسات تصحيح الأخطاء وردود الفعل] 2 ساعة.] -جعل الطلبة على د ا راية بالعلاقة بين أساليب التعلم وأساليب التدريس. -تشجيع الطلبة على "توسيع" أساليبهم An introduction to communication in general and the Arabic language in particular, with an introduction to word classes (parts of speech) in Arabic [4 hours]. An explanation of each part of speech in Arabic, such as nouns, pronouns, verbs,

	adjectives, adverbs, prepositions, conjunctions, and conjunctions [16 hours]. Basic skills in learning English: reading and writing are gradually introduced over the first few weeks [6 hours]. The final part is devoted to some correction and feedback sessions [2 hours]. - Making students aware of the relationship between learning styles and teaching styles. Encouraging students to "expand" their styles -

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	المحاضرة المصحوبة بالشرح والتحليل. الحلقة النقاشية. التقارير والبحو ث. عرض المادة عبر شرائح)بوربوين ت.) الاسئلة والاجوبة. المشاركة الصفية Lecture accompanied by explanation and analysis. Discussion session. Reports and research. Presentation of the material via PowerPoint slides. Questions and answers. Class participation

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	45	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem)	5	**Unstructured SWL (h/w)**	

الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**50**		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	3	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	3	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	0		Continuous	All
	Report	1	20% (20)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	3hr	10% (10)	7	LO #1 - #7
	Final Exam	3	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	اقسام الكلمة وتعريفاتها
Week 2	علامات الاعراب الأصلية والفرعية

Week 3	المفاعيل في العربية
Week 4	بناء الفعل المعلوم والمجهول
Week 5	اقسام الأفعال في العربية
Week 6	التغاير النوعي التذكير والتأنيث
Week 7	التغاير الصرفي المقصور والمنقوص والممدود
Week 8	التغاير الكمي المثنى والجمع
Week 9	الاعداد في العربية
Week 10	كتابة الهمزة في العربية
Week 11	التاء المربوطة والتاء المفتوحة
Week 12	علامات الترقيم
Week 13	الاغلاط النحوية الشائعة
Week 14	الأغلاط اللغوية
Week 15	الأغلاط الصرفية

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
	شرح ابن عقيل على الفية ابن مالك ، المرشد في الاملاء ، محمد شاكر	

	سعيد	
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	**Botany General**			**Module Delivery**	
Module Type	**Core**			☒Theory ☒Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	**Bio-1204**				
ECTS Credits	8				
SWL (hr/sem)	200				
Module Level	1		**Semester of Delivery**	2	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. Allaa Huseen Ali		**e-mail**	wassbio54@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Allaa Huseen Ali		**e-mail**	alaasbio63@uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**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 Objectives أهداف المادة الدراسية	This study aims 1. Clarification of basic information about the basic vocabulary of the curriculum and how to use it in the anatomy of plants in practice. 2. Teaching students how to prepare different plant tissue sections. Conducting histological comparisons between different aggregates.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. 1. Students became able to understand nature of higher plants tissues. 2. 2. Helping students to identify plants tissues. 3. Encourage the students to improve skills of plant anatomy.nd proteins and understanding how to distinguish between amino acids
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> Botany. Parts of Plant. Plant cell. Plant Cell Structures and Organelles. A cell wall. Plant tissue [*10* hrs] Permanent tissue. Meristematic tissue[*12* hrs] Plasma membrane structure. Protoplast properties. Cell division(mitosis and meiosis . [*10* hrs] Nutrition and food chain. Nutrition and food chain. Energy flow. [3 hrs] <u>Part B – Practical labs</u> Plant form . Plant function. plant cell. The cell wall. Living components of plant cell . Types and functions of plastids. Non-living components. :types of starch grains. Non-living components [18 hrs] types of crystals. Plant Tissues, Meristimatic tissues.. Apical M.T., Lateral M.T. Intercalary M.T.. Permanent tissues. Dermal tissue, Parenchyma tissues, Collenchyma ,T.. Sclerenchyma T. , Fibers, Sclerides.. Vascular tissues : The Xylem , The phloem [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents. Various techniques were used such as. Data show , Microscope, Posters , Samples of plants keep in alcoholic solution . Students do study the following fields: Higher Plants structures. Anatomy procedures. Learning compositions of plant tissues. Comparison between monocots and dicots tissues. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students**.**

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	108	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	92	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**200**		

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

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Botany
Week 2	Parts of Plant
Week 3	Plant cell
Week 4	Plant Cell Structures and Organelles
Week 5	A cell wall
Week 6	Plant tissue
Week 7	Permanent tissue
Week 8	Meristematic tissue
Week 9	Plasma membrane structure
Week 10	Protoplast properties
Week 11	Cell division(mitosis and meiosis
Week 12	Nutrition and food chain
Week 13	Nutrition and food chain
Week 14	Energy flow
Week 15	Energy flow

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab1:Plant form
Week 2	Lab2:Plant function
Week 3	Lab3: plant cell
Week 4	Lab 4;The cell wall
Week 5	Lab5 :Living components of plant cell
Week 6	Lab6:Types and functions of plastids
Week 7	Lab 7: Non-living components
Week 8	Lab8:types of starch grains

Week 9	Lab 9: Non-living components
Week10	Lab10: types of crystals
Week 11	Lab11 : Plant Tissues, Meristimatic tissues.
Week 12	Lab12: Apical M.T., Lateral M.T. Intercalary M.T.
Week 13	Lab13 :Permanent tissues‹
Week 14	Lab14 Dermal tissue, Parenchyma tissues, Collenchyma ,T.
Week 15	Lab15:Sclerenchyma T. , Fibers, Sclerides.

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1. **Cutler, D.F.; Botha. T. and Stevensons, D. W.(2007).**Plant Anotomy An Applied Approach. Blackwell.	Yes
Recommended Texts	Rudall, P. J. (2007). Anatomy of Flowering Plant. Cambridge University Press.	Yes
Websites	https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/plant-anatomy https://www.sciencedirect.com/science/article/abs/pii/B9780128021040000044	

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
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	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
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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

Module Information معلومات المادة الدراسية					
Module Title	Organic Chemistry			**Module Delivery**	
Module Type	**Core**			☒Theory # Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	**Bio-1205**				
ECTS Credits	8				
SWL (hr/sem)	200				
Module Level		1	**Semester of Delivery**		2
Administering Department		BIO	**College**	Sci	
Module Leader	Dr.Hiba Ameen Ibraheem		**e-mail**	hiba.ameen80@uomosul.edu.iq	
Module Leader's Acad. Title		lecture	**Module Leader's Qualification**		Ph.D.
Module Tutor	Dr.Hiba Ameen Ibraheem		**e-mail**	hiba.ameen80@uomosul.edu.iq	
Peer Reviewer Name		Adnan Othman Omer	**e-mail**	Adnana.hasska94@uomosul.edu.iq	
Scientific Committee Approval Date		1/10/2024	**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 Objectives أهداف المادة الدراسية	DESCRIPTION The Systematic Identification of Organic Compounds A comprehensive introduction to the identification of unknown organic compounds, Identifying unknown compounds is one of the most important parts of the study of chemistry. From basic characteristics such as melting and/or boiling point to more complex data generated through cutting-edge techniques, the range of possible methods for identifying unknown organic compounds is substantial. The utility of a research reference which compiles known techniques and characteristics of possible compounds is clear. The Systematic Identification of Organic Compounds provides such a reference, designed to teach a hands-on approach in the chemistry lab. It takes readers step-by-step through the process of identifying an unknown compound and elucidating its structure from infrared, nuclear magnetic resonance, and mass spectra in addition to solubility characteristics, melting point, boiling point, and classification tests. The result is an essential overview for advanced chemistry students looking to understand this exciting area of laboratory work. Readers of the ninth edition of The Systematic Identification of Organic Compounds will also find: • A detailed chapter on safety, personal protection equipment, chemical storage, safety data sheets, and other safety concerns • Questions at the end of each chapter designed to facilitate and reinforce progression, keyed to a companion website for instructors • Tables of known compounds including data relevant for identification • Companion website with structural problems from experimental data for students to practice how to reason and solve, The Systematic Identification of Organic Compounds is a useful reference for advanced undergraduates and graduate students studying organic chemistry, organic spectroscopy, and related subjects **Chemical properties**: Structural isomers would have the **same chemical property** if they have the **same functional group(s)** in their structural formula.*****, This effectively means that only **functional group isomers** would have different chemical properties., As you have learnt in Preliminary HSC Chemistry, a different functional group provides a **distinctive** chemical property to the molecule to undergo certain chemical reactions. **Physical properties**The following guidelines will help you compare the melting and boiling points between different isomer molecules. As you will explore with polymers which is part of the last Inquiry Question in Module 7, you learn that molecules (e.g. isomers) that exhibit a **less branched** (or linear) structural formula have a **higher** melting and boiling point. Therefore, you would expect the more chain branching that a molecule exhibits, the lower its melting and boiling point will be. This is because chain branching prevents the isomers from packing their carbon chains closely together and, thus, the intermolecular forces (e.g. dispersion

	forces) between them would be weaker. As we have explored in Preliminary HSC Chemistry, intermolecular forces play an important role in governing the melting and boiling point of molecules. As for functional group isomers, the isomers have different functional groups allowed differing extent of chain branching (thus affecting dispersion forces) and maybe different degree of dipole-dipole and hydrogen bonding. Therefore, their melting and boiling point (physical property) may vary. **Example:** Alcohols (- OH) and carboxylic acids (- COOH) have different melting and boiling points due to different functional groups.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• Module content:, • Some organic chemistry fundamentals, basic concepts and terminology, Naming and classification of organic compounds, Basic reactions of alcohols, ethers and carbohydrates, Natural polysaccharides: modification and utilization in various applications, Group work (including presentation and evaluation of the other group works): Preparation of biofuels from biomass, Preparation of adsorbents from starch, Novel method for preparation of 5-hydroxymethylfurfural from biomass or Preparation of bio-plastics from biomass, Learning outcomes: After completing organic chemistry module student should be able to: identify and draw organic compound, provide the IUPAC name for some organic compounds, classify alcohols, explain the properties of alcohols and ethersdiscuss the reactions of alcohols and ether, recognize functional groups that are present in monosaccharides, classify carbohydrates to mono- di, oligo- and polysaccharides identify the structural difference between following polymers: amylose, amylopectin, cellulose and glycogen, • discuss the basic reactions of monosaccharides • discuss the reactions of starch and cellulose such as hydrolysis, estherification and, etherification• know how and why to use biomass in different applications• In addition to comprehend to the theory, the idea of the project work is to enhance group-working skills, social skills, planning skills, the ability to explore information and interpret found information, presentation and reporting skills, responsibility taking and knowledge about the biomaterial applications., Learning activities and teaching methods: • 30 hours on-line working / independent self-study. Teacher and student contact will be mainly through distance-learning tools (E.g. Adobe Connect meetings and discussion forums). Dail, Remarks: • • An intensive study period that will be carried out where an in-depth study of one of the goals of the course will be done including workshops and hands-on applications of theory. • learning objectives, tasks and pace guide are given on Canvas learning platform: Learning can be • tested by doing daily exercises.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures **Second Course:** Introduction, bonds, hybridization, physical properties and molecular structure , **alkanes and cycloalkanes**- nomenclature, stereochemistry, conformational analysis, and an introduction to synthesis-hydrogenation of alkenes and alkynes, reduction of alkyl halides, reduction of carbonyl compounds, decarboxylation, [*10* hrs]

	Melting point and boiling point of organic compound Revising of Systematic identification of organic compounds Studying the element test and classification of organic compounds [8 hrs] Assorting the compounds on groups of solubility and detect the suitable solvent Studying the Functional groups testsGrignard reagents, Wurtz reaction, Corey- House synthesis. **Alkene, Alkadiene, Alkyne**- nomenclature, Reactions and synthesis- elimination**,** dehydrohalogenation**,** Zaitsev's and Hofmann's rules, dehydration of alcohols, E1-E2 reaction, rearrangements, debromination, syn addition, anti addition, Markovnikov's rules, mechanism, oxidation- *Hydroboration–oxidation,* epoxidation of alkenes.[3 hrs] Part B – Practical labs . Physical constant, A group of 4 students measured melting and boiling points of some unknown compounds using lab apparatus. Element test presentation and lab work, A group of 4 students identify presence or absence elements in some unknown compounds using organic solvents and reagents. [18 hrs], Solubility test presentation and lab work, A group of 4 students identify solubility of some unknown compounds using organic solvents., First Quiz , Functional groups tests presentation and lab work, Week 5&6 a group of 4 students identify presence or absence of functional groups of some unknown compounds using chemical solvents and reagents. Second Quiz, Each student individually identifying an unknown based on the information and experience gained in the 1, 2, 3, 4, 5&6 training weeks. 6 weeks are specified to complete identifying with using organic chemistry literature.[18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**Course Outcomes:** The student will learn how to identify an organic compound systematically. **Weekly Teaching Plan:** In the first week there will be a general presentation about the course and how to behave in the lab. Except for the first 4 weeks all

	the remaining weeks involve lab. work only. **Students Behaviour in Class:** Keen to learn, friendly and cooperative **Computer Usage:** search for compounds in dictionary. **Teaching Techniques:** Student learn how to use test tube reactions techniques. **Suggestions:** An attempt to combine the two methods used to identification of organic compounds, which is the chemical method and the spectroscopic method

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	108	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	92	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**200**		

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)
المنهاج الأسبوعي النظري

	Material Covered
Week 1	Introduction of fundamental of organic compound and the study references.
Week 2	An authentic of identification, its definition, taxonomic status and importance.
Week 3	The physical and chemical properties can affected on organic compounds
Week 4	Features and structures used in directing shields and shells.
Week 5	Melting point and boiling point of organic compound
Week 6	Revising of Systematic identification of organic compounds
Week 7	Studying the element test and classification of organic compounds
Week 8	Classification the organic compounds according the solubility
Week 9	Assorting the compounds on groups alkane, alkene and alkyne
Week 10	Numen culture of hydrocarbons, alkane, alkene and alkyne
Week 11	Synthesis of alkanes.
Week 12	The reaction of alkanes
Week 13	Mid examination and quiz1
Week 14	Synthesis of alkenes and alkynes
Week 15	The reaction of alkenes and alkynes

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: General Lecture
Week 2	Lab 2: Physical constantA group of 4 students measured melting and boiling points of some unknown compounds using lab apparatus.
Week 3	Lab 3:: laboratory safety
Week 4	Lab 4: Glass ware, A group of 4 students identify presence or absence elements in some unknown compounds using organic solvents and reagents.
Week 5	Lab 5: Melting point
Week 6	Lab 6:Boiling point: A group of 4 students identify solubility of some unknown compounds using different organic compounds
Week 7	Lab 7: Simple distillation

Week 8	Lab 8: Fractional distillation, a group of 4 students identify presence or absence of functional groups of some unknown compounds using chemical solvents and reagents.
Week 9	Lab9: Steam distillation
Week10	Lab 10: Recrystallization
Week 11	Lab 11: Sublimation, Comparative between the Unknown and the theoretical organic compound in adiabatic literature
Week 12	Lab 12: Each student individually identifying an unknown based on the information and experience gained in the 1, 2, 3, 4, 5&6 training weeks. 6 weeks are specified to complete identifying with using organic chemistry literature.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**1) Organic Chemistry by Morrison and Boyd 2016** **2) Organic Chemistry by 4th ed by Paula Bruice 2017.,** **3) Essential Organic Chemistry 3rd ed by Paula Yurkanis Bruice 2018**	Yes Yes
Recommended Texts	**اساسيات الكيمياء العضوية د. رعد الحمداني**	Yes
Websites	https://shop.elsevier.com/books/introduction-to organic chemistry /haq/978-0-444-82672-5	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group	**A -** Excellent	امتياز	90 - 100	Outstanding Performance

(50 - 100)	**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

Module Information معلومات المادة الدراسية					
Module Title	**Safety and biosecurity**			**Module Delivery**	
Module Type	**core**			☒**Theory** ☒**Lecture** ☐ **Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**Bio-1207**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	**1**		**Semester of Delivery**	2	
Administering Department	**Bio**		**College**	**Sci**	
Module Leader	Ammar Ghanem AlDabagh		**e-mail**	Amrksbio100@uomosul.edu.iq	
Module Leader's Acad. Title	lecturer		**Module Leader's Qualification**	**M.Sc**	
Module Tutor	Ammar Ghanem AlDabagh		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	**1/10/2024**		**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 Objectives أهداف المادة الدراسية	Students do study the following fields: 1. اعطاء توضيح عن مادة السلامة والامن البيولوجي والهدف من دراستها 2. توضيح اهمية دراسة السلامة والامن البيولوجي ودورها في الحياة اليومية 3. التطرق لبعض المخاطر البيولوجية المهمة المنتشرة في المجتمع وطرق السيطرة عليها ومنع حدوثها
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- ان يكون للطالب المام بهذه المادة واهميتها 2- ان تصبح للطالب قدرة وامكانية توصيل معلومات صحية وايصالها لأفراد اسرته ولمن حواليه 3- وقوف الطالب على الاساليب التي يجب التعامل من خلالها مع جميع مفردات تطبيق السلامة البيولوجية وتوضيحها لجميع شرائح المجتمع وخاصة العاملين في هذا المجال 4- معرفة بعض الحالات التي يتعرض لها الانسان واسباب حدوثها وكيفية التعامل معها في حالة حدوثها
Indicative Contents المحتويات الإرشادية	هذه المادة الدراسية لها دور كبير في تعليم الطالب اساسيات السلامة البايولوجية وامن المواد الخطرة بكل مواضيعها و يحقق خلفية علمية رصينة للطالب في علم البايولوجي ومواده واساسياته تمكنهم من اداء دورهم البناء في خدمة المجتمع من خلال التوعية والارشاد و معرفة آليات التعامل مع المواد البايولوجية و الاتفاقيات الخاصة بالسلامة البايولوجية

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 by Using appropriate teaching strategies and methods and teaching aids to develop thinking skills.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.2

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	3	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	3	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	0		Continuous	All
	Report	1	20% (20)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	3hr	10% (10)	7	LO #1 - #7
	Final Exam	3	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	تعريف السلامة والامن البيولوجي والمصطلحات المتعلقة بها وشرحها بصورة مفصلة
Week 2	التعامل الصحيح في المختبرات خاصة مختبرات الاحياء المجهرية

Week 3	دراسة طرق الوقاية عند التعامل مع المواد الخطرة واجراءات السلامة في حال حصول حوادث
Week 4	First Quiz
Week 5	طرق التعامل والسيطرة على المخاطر البيولوجية
Week 6	Mid Exam
Week 7	دراسة التقنيات المختبرية الامنة
Week 8	التعامل الأمن مع العينات المختبرية وطرق نقلها
Week 9	second Quiz
Week 10	نقل المواد البيولوجي
Week 11	احتمالية اساءة استخدام العلوم البايولوجية
Week 12	Third Quiz
Week 13	مكافحة المخاطر البيولوجية
Week 14	تكليف الطلاب بأعداد واجبات متنوعة لغرض التدريب على الطرق الصحيحة في التعامل مع كل ما يتعلق بالحفاظ على صحة الفرد وتجنبه للمخاطر التي قد يتعرض لها نتيجة الجهل في التعامل في المجالات المتعلقة بالصحة خاصة الكوادر التي تعمل في مجال الصحة
Week 15	مراجعة المنهج والوقوف على استفسارات الطلاب وآرائهم حول المنهج

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
	منهاج مادة السلامة والامن الحيوي اعداد اللجنة الجامعية المركزية للسلامة والامن الكيمياوي والاشعاعي CBRNوالنووي ومنع الانتشار	
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	**Computer Science1**			**Module Delivery**	
Module Type	**Basic**			☒**Theory** ☐**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**UOM103**				
ECTS Credits	**3**				
SWL (hr/sem)	**75**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	**Bio.**		**College**	**Sci.**	
Module Leader	Omar Qusay Alshebly		**e-mail**	omarqusay@uomosul.edu.iq	
Module Leader's Acad. Title	lecturer		**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	**1/10/2024**		**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 Objectives أهداف المادة الدراسية	1. Improved Communication: Fast communication can help increase productivity, allow for better business decisions and facilitate company expansion into new regions or countries. The movement of information within organizations or companies has become instantaneous. Employees can easily transfer data across departments without any interruption. Tools such as email, electronic fax, mobile phones, and text messages enhance the movement of information data between employees, customers, and business partners or suppliers, allowing for greater connectivity across internal and external structures. 2. Work: Streamlined workflow systems, shared storage, and collaborative workspaces can increase business efficiency and allow employees to process a greater level of work in a shorter period of time. Information technology systems can be used to automate routine tasks, to facilitate data analysis and to store data in a way that can be easily retrieved for future use. Technology can also be used to answer customer questions through email, in a real-time chat session, or through a phone routing system that connects the customer to an available customer service agent. 3. Cost Reduction and Economic Efficiency: Communication technology and social technology have made business promotion and product launch affordable. Many small businesses have found ways to use social technology to increase their brand awareness and get more customers for less. In business, factors such as operating cost play an important role in business development and growth. So when companies use information technology to reduce operating costs, the return on investment will increase, which will lead to business growth.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Enhancing the ability of information technology to adapt and respond to the multiple, renewable and constantly changing needs of all parties benefiting from the outputs of the information system, especially the university leaders in the researched university, and thus enables information technology to carry out its work efficiently and effectively. Predicting the studied phenomenon in the future by means of Box-Jenkins model. 2. Employing information technologies in the axes of the educational process worked to build a bridge of vital communication between faculty members and all sources of the educational process, and this necessarily means facilitating the teacher's task in delivering information to the student within an interactive technical environment, and information technologies provide multiple sources in order to obtain information Whether it is from sources within the university or from the Internet and the educational technologies it contains.
Indicative Contents	Although the information technology specialization is one of the most demanded fields currently in all global markets, some specializations range from stagnant to saturated

المحتويات الإرشادية	and required, so you should study the market well before choosing a specialization. But if you are looking for the best majors that have a future in the field of information technology, then they are as follows: Network security major in programming - software engineering - 3D printing - data science major - Artificial Intelligence - Computer Science - Aerospace Engineering

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 by Using appropriate teaching strategies and methods and teaching aids to develop thinking skills.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	12	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	-----
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**75**		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	All
	Assignments	2	10% (10)	2 and 12	All
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	All
Summative assessment	**Midterm Exam**	2hr	20% (10)	7	All
	Final Exam	3	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Getting to know the computer and the history of its stages of development - indicating the types of computers - installing the computer - defining the physical parts
Week 2	Data entry units and data output units to the computer - The central processing unit and its tasks
Week 3	Primary and secondary memories - Types of displays
Week 4	Software
Week 5	Computer operating systems
Week 6	Low-level languages and high-level languages
Week 7	Service application software
Week 8	Getting to know the Word program - How to open or run the program - Transforming the Word program interface - Word program menus.

Week 9	Home Toolbar - Home Page Insert Menu - Toolbar - Insert Menu - Page Layout
Week 10	Microsoft Excel - the most common uses of the Excel program - opening the Excel program - closing the Excel program - an explanation of the main toolbar of the Excel program
Week 11	Entering data in Excel program - how to navigate in a worksheet - inserting a function from the ready-made functions into a cell - examples - shading cells - clearing cells
Week 12	The basics of building a POWER POINT presentation - entering the program and the program interface - creating a new presentation
Week 13	Open a presentation file - save a presentation - insert a new slide - add shapes to the slide - slide margins - slide design - add animations to the slide
Week 14	Internet - services provided by the Internet - keywords, comprehensive search engines
Week 15	Create an E-mail
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Lab 1	Word applications (1)
Lab 2	Word applications (2)
Lab 3	Applications on Excel (1)
Lab4	Applications on Excel (2)
Lab 5	Power Point applications (1)
Lab 6	Power Point applications (2)
Lab 7	E-mail applications

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Fundamentals of Information Technology	Yes
Recommended Texts	Glend Gay and Ronald B., "Information Technology", 3 rd Ed, CSEC,OUP Oxford ,2019.	Yes

Websites	http://itacademic.ir/upload/IT Fund.&Infra-1.pdf www.oxfordsecondary.com/9780198437161	

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

Module Information					
Module Title	English Language1			Module Delivery	
Module Type	Basic			☒Theory ☒Lecture ☐Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	UOM102				
ECTS Credits	2				
SWL (hr/sem)	50				
Module Level	1		Semester of Delivery	2	
Administering Department	Bio		College	Sci	
Module Leader	Younis Hamad Ahmed		e-mail	Younis.h81@uomosul.edu.iq	
Module Leader's Acad. Title	Teaching Assistant		Module Leader's Qualification	MA	
Module Tutor			e-mail		
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date	1/10/2024		Version Number	1.0	

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	**This course is aimed to increase students' knowledge in terms of different vocabulary, phrases, clauses and medical physics-related terminology. It enables the learners to express what they would like to communicate while they are still studying at college or even when they get their potential jobs. Also, this course encourages the learners to read books, articles and browse department-related websites to search for information needed.**
Module Learning Outcomes	**- Differentiating between general English communications and scientific English communication** **- Learning commonly-used terminology in the field of Medical Physics.** **- Understanding specific phrases & expressions written or spoken.** **- Increasing learners' confidence in reading books and research conducted by scholars around the world.** **- Motivating learning strategies for learners and improving their autonomous skills.** **- Evaluating their language skills and benefitting from feedback given throughout the course.**
Indicative Contents	**Introduction about communication in English language, followed by general English information. Also, explaining some strategies to follow by earners to progress in the subject [8hrs]. Clarifying the English language skills in general and moved to vocabulary and its importance in English language [6]. Differentiating between parts of speech and showing the difference between general English and scientific English [3]. Detailing the main skills; writing, licensing, reading and speaking and doing some practice sessions with feedback sessions where needed [9]. Feedback and error corrections practices with some review over the whole course [4hrs].**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Engaging learners in the learning process is essential . Modern learning processes depend hugely on collaborative work by students. Also, focusing on some quick quizzes is seen as successful strategy though. Also, it is known that homework plays

	important roles in improving learners' academic records. Paying attention to the point that every class has mixed-ability learners.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	45	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	5	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	-----
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**50**		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	20% (20)	2,3,5 and 6	LO #1, #2 and #5 and #6
	Assignments	4	10% (10)	2,4,7 and 8	LO #2, #3, #5and #6
	Projects / Lab.				
	Report	4	10% (10)	3,4,6 and 8	LO #3, #4, #5 and #6
Summative assessment	Midterm Exam	2hr	10% (10)		
	Final Exam	3hr	50% (50)		
Total assessment					100% (100 Marks)

ملاحظة: في حالة كون المادة لا تحتوي على جانب عملي تضاف الدرجة الخاصة بها الى أي محور اخر يختاره استاذ المادة من تفصيلات الدرجة اعلاه

Delivery Plan (Weekly Syllabus)
المنهاج الأسبوعي النظري

	Material Covered
Week 1	An introduction on general English language

Week 2	Understanding communication in English language
Week 3	Delivering study strategies for learners throughout the whole course
Week 4	Methods of improving English language skills
Week 5	An introduction about vocabulary in English language in general
Week 6	Teaching some skills required to increase and improve learners' vocabulary in the course.
Week 7	Teaching learners different phrases, clauses and expressions commonly-used in the field.
Week 8	Doing useful class activity in order to encourage collaborative work between students.
Week 9	Teaching writing skills and focusing on writing short paragraphs correctly.
Week 10	Doing feedback sessions and focusing on error corrections
Week 11	Teaching listening skills and assigning homework individually and collaboratively.
Week 12	Teaching reading skills in general and focusing on necessary strategies required.
Week 13	Doing some reading practice inside classroom and giving some feedback and error correction.
Week 14	Teaching speaking skills and encouraging group sessions and course-related discussions
Week 15	Reviewing some main topics from the past weeks and doing quick re-capping for the course.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	
Week 8	
Week 9	
Week10	
Week 11	
Week 12	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	*Edward, S. (2011). English Grammar for ESL Learners.* *Mc.Graw.Hill*	YES
Recommended Texts	Quang, N. (2009). *English for Medical Students*. HUE	NO
Websites	English Grammar for ESL Learners (PDFDrive).pdf https://pdfcoffee.com/qdownload/english-for-medical-students-coursebook-pdf-free.html	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
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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

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MODULE DESCRIPTION FORM

Module Information معلومات المادة الدراسية					
Module Title	**Entomology1**			**Module Delivery**	
Module Type	**Core**			☒Theory ☒ Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	**Bio-2308**				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level		2	**Semester of Delivery**		3
Administering Department		Bio	**College**	Sci	
Module Leader	Dr. Muneef Abid Mustafa		**e-mail**	munsbio6@uomosul.edu.iq	
Module Leader's Acad. Title		Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	Aulfat tahseen Ammar Ghanim Younis Ibraheem		**e-mail**	Alfsbio76@uomosul.edu.iq Amrksbio100@uomosul.edu.iq	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		1/10/2024	**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 Objectives أهداف المادة الدراسية	This study aims 1. Enable the student to identify arthropods. 2. The most important people that it includes. 3. Expand with the insect class and identify the external and internal morphological characteristics of insects. 4. Know the taxonomic position of insects. 5. Classification methods using taxonomic records.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. students learn how to distinguish an insect from other arthropoda 2. students get knowledge about the insect's body parts in detail for the head, thorax and abdomen 3. students learn the way of feeding insects by knowing the parts of their mouth parts with a microscope
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Introduction of insect and distinguish an insect from other arthropoda. The type of orientation on head , types of sutures, types of antenna (1). Antenna 2 , Mouth parts of grasshopper and cockroach . [*15* hrs] Mouth parts of housefly + Mouth parts of horsefly and is table fly .Mouth parts. of mosquito. [*10* hrs] Mouth parts. of honey bee Mouth parts of plant bug . Mouth parts of bed bug Mouth parts of butterfly .Types of legs , Types of wings[11 hrs] Revision problem classes [3 hrs] Part B – Practical labs Introduction of insect ,distinguish an insect from other arthropoda. The type of orientation on head , types of sutures + types of antenna (1) .Antenna 2,Mouth parts of grasshopper and cockroach, Mouth parts of housefly. [18 hrs] Mouth parts of horsefly and is table fly .Mouth parts of honey bee . Mouth parts of mosquito. Mouth parts of plant bug . Mouth parts of bed bug. Mouth parts of butterfly Types of legs Types of wings. [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**Expanding students' perceptions about this science and its contents. Various techniques were used such as showing any living and saved models and means of illustration and sometimes the use of projector. Study the characteristic of the insect class. Division the body of the insect into head – thorax – abdomen and study the appendages of the head and thorax and abdomen. Study the difference between insects and other arthropoda. Methods of preserving the insects. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.**

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction in Entomology.
Week 2	Structure of insects.
Week 3	Exoskeleton.
Week 4	Head.
Week 5	Antennae.
Week 6	Mouth parts.
Week 7	Thorax .
Week 8	Legs, Wings
Week 9	Digestive System part 1
Week 10	Digestive System part 2
Week 11	Respiratory System part 1
Week 12	Respiratory System part 2
Week 13	Circulatory System part 1
Week 14	Circulatory System part 2
Week 15	Reproductive System

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction of insect
Week 2	Lab 2: distinguish an insect from other arthropoda
Week 3	Lab 3: The type of orientation on head
Week 4	Lab 4: types of sutures + types of antenna (1)
Week 5	Lab 5: antenna 2
Week 6	Lab 6: Mouth parts of grasshopper and cockroach
Week 7	Lab 7: Mouth parts of housefly
Week 8	Lab 8: Mouth parts of horsefly and istable fly
Week 9	Lab9: Mouth parts of honey bee
Week10	Lab 10: Mouth parts of mosquito

Week 11	Lab 11: Mouth parts of plant bug
Week 12	Lab 12: Mouth parts of bed bug
Week 13	Lab 13: Mouth parts of butterfly
Week 14	Lab 14: Types of legs
Week 15	Lab 15: Types of wings

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**The Insects: Structure and Function , R. F. Chapman - Fifth Edition , Published by Cambridge University Press, 2013** **AN OUTLINE OF ENTOMOLOGY P.J. Gullan and P.S. Cranston, 2014** . **Chapman, R.F. (1998). " The Insects Structureand Function " Ed[4]. English Universities Press LTD.** **Eldridge, B.F. and Edman, J.D. (2012). "Medical Entomology". Kluwer Academic Publishers.**	Yes Yes Yes Yes
Recommended Texts	**Nesbit, C. and Nesbit, A. (2017). "Insecta" teNeues Publishing Company, 220 pages .**	No
Websites	https://www.britannica.com/science/entomology https://www.royensoc.co.uk/understanding-insects/what-is-entomology/	

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

Module Information معلومات المادة الدراسية					
Module Title	**Plant Anatomy**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Bio-2309**				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level		2	**Semester of Delivery**		3
Administering Department		Bio	**College**	Sci	
Module Leader	Dr. Wasan Salih Hussain		**e-mail**	wassbio54@uomosul.edu.iq	
Module Leader's Acad. Title		Assistant Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	Dr. Badia Abd Al-Razzak Malla Obaida Ali Ahmad Ali Majed Shukr		**e-mail**	badia.jamal@uomosul.edu.iq alisbio107@uomosul.edu.iq	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		1/10/2024	**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 Objectives أهداف المادة الدراسية	This study aims 1. Clarification of basic information about the basic vocabulary of the curriculum and how to use it in the anatomy of plants in practice. 2. Teaching students how to prepare different plant tissue sections. 3. Conducting histological comparisons between different aggregates.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. 1. Students became able to understand nature of higher plants tissues. 2. 2. Helping students to identify plants tissues. 3. 3. Encourage the students to improve skills of plant anatomy.nd proteins and understanding how to distinguish between amino acids
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Plant Anatomy,The important of studying plant anatomy .The cell wall,Formation of the cell wall. Plant Tissues, 1. Meristematic tissues,2. Permanent tissues . Parenchyma tissue, collenchma tissues ,Sclerenchyma tissues. [*10* hrs] Dermal Tissues, The Periderm. The Epidermis. Stele Biology .Trichomes. The Xylem ,Primary and secondary xylem. The Phloem, Primary and secondary phloem.[*12* hrs] The Stem, stem in monocotyledon. stem in dicotyledon. stem in dicotyledon. The Root. root in monocotyledon, root in dicotyledon. Secondary growth.. [*10* hrs] Revision problem classes [3 hrs] Part B – Practical labs The plant cell, The cell wall, pits. Intercellular spaces, living & nonliving components. Plant Tissues , Meristimatic Tissues .Apical M.T., Lateral M.T. Intercalary M.T. Perminant Tissues, Parenchyma tissues .Collenchyma Tissues. Sclerenchyma T. [18 hrs] Fibers, Sclerides. Dermal T. ,Epidermis, Stomata . Types & components , subsidiary cells. The Xylem. The phloem. Cross section in monocotyledon & dicotyledon root. Cross section in monocotyledon. [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**Expanding students' perceptions about this science and its contents. Various techniques were used such as. Data show , Microscope, Posters , Samples of plants keep in alcoholic solution . Students do study the following fields: Higher Plants structures. Anatomy procedures. Learning compositions of plant tissues. Comparison between monocots and dicots tissues. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.**

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Plant Anatomy,The important of studying plant anatomy.
Week 2	The cell wall,Formation of the cell wall.
Week 3	Plant Tissues, 1. Meristematic tissues,2. Permanent tissues.
Week 4	Parenchyma tissue, collenchma tissues ,Sclerenchyma tissues.
Week 5	Dermal Tissues, The Periderm.
Week 6	The Epidermis.
Week 7	Stele Biology.
Week 8	Trichomes.
Week 9	The Xylem ,Primary and secondary xylem.
Week 10	The Phloem, Primary and secondary phloem.
Week 11	The Stem, stem in monocotyledon. stem in dicotyledon.
Week 12	stem in dicotyledon.
Week 13	The Root .
Week 14	root in monocotyledon, root in dicotyledon.
Week 15	Secondary growth.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: The plant cell, The cell wall, pits.
Week 2	Lab 2: Intercellular spaces, living & nonliving components.
Week 3	Lab 3: Plant Tissues , Meristimatic Tissues.
Week 4	Lab 4: Apical M.T., Lateral M.T. Intercalary M.T.
Week 5	Lab 5: Perminant Tissues, Parenchyma tissues.
Week 6	Lab 6: Collenchyma Tissues .
Week 7	Lab 7: Sclerenchyma T.
Week 8	Lab 8: Fibers, Sclerides.
Week 9	Lab9: Dermal T. ,Epidermis, Stomata.

Week10	Lab 10: Types & components , subsidiary cells.
Week 11	Lab 11: The Xylem .
Week 12	Lab 12: The phloem.
Week 13	Lab 13: Cross section in monocotyledon & dicotyledon root.
Week 14	Lab 14: Cross section in monocotyledon.
Week 15	Lab 15: Cross section in dicotyledon stem.

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1. **Cutler, D.F.; Botha. T. and Stevensons, D. W.(2007).**Plant Anotomy An Applied Approach. Blackwell.	Yes
Recommended Texts	Rudall, P. J. (2007). Anatomy of Flowering Plant. Cambridge University Press.	Yes
Websites	https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/plant-anatomy https://www.sciencedirect.com/science/article/abs/pii/B9780128021040000044	

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

Module Information معلومات المادة الدراسية					
Module Title	**Invertebrates**			**Module Delivery**	
Module Type	**Core**			☒Theory ☒ Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	**Bio-23010**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	2		**Semester of Delivery**	3	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. Najah Subhi Nayef		**e-mail**	Najahsobhi@gmail.com	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Senaa Abdullah Ali Fulk Abdulhafedh Raja Abdulrahman		**e-mail**	sensbio23@uomosul.edu.iq fulk7676khattab@gmail.com	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**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 Objectives أهداف المادة الدراسية	This study aims: 1. Convey information about invertebrates to students about their types. 2. Knowing the methods of its diagnosis and its activities. 3. Keep up with the development that is happening in the world.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Harmful or Dangerous Invertebrates. 2. Medical importance of invertebrates. 3. Through this study the students recognize the invertebrates. 4. We comforting the students to diagnosis the invertebrates animals.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> I **Characteristics of Invertebrates**. **Classification of Invertebrates**. **Importance of Invertebrates**. **Protozoan Phyla: Characteristics of Protozoan Phyla Amoeba Proteus. Phylum Porifera .General Characteristics of Porifera.,Classification of Phylum Porifera**: **Canal Systems in Sponges, Phylum Cnidaria or Coelenterata. General Characteristics of Cnidaria Classification of Phylum Cnidaria ,Hydra.**[*10* hrs] , **Pseudocoelomates ,General Characteristics of Pseudocoelomates ,Phylum Rotifera or Rotatoria ,General Characteristics of Phylum Rotifera**: **Classification of Phylum Rotifera Brachionus rubens**[*8* hrs] **Phylum Annelida General Characteristics of Phylum Annelida** : **Classification of Phylum Annelida. Nereis .PHYLUM ARTHROPODA .General characteristics of phylum Arthropoda .Classification of Phylum Arthropoda Astacus .** [*10* hrs] **PHYLUM Mollusca .General characteristics of phylum Mollusca Phylum Echinodermata General characteristics of Phylum Echinodermata Classification of phylum Echinodermata .Asterias (Seastar or Starfish).** [8 hrs] Revision problem classes [3 hrs] <u>Part B – Practical labs</u> **Introduction of Invertebrates .Protozoa.Didinium, stentor . Noctiluca.Foraminifira,leucosolenia .Spicules.** [18 hrs] **Spongin fibers.Gemmules.Coelenterata.Hydra.Obelia,Medosa.Physalia.Aurelia,Metridium,Tubipo a. Nereis,Hirud .Arthropoda.** [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents. Various techniques were used such as. Data show , Microscope, Posters , Samples of Invertebrates keep in alcoholic solution Students do study the following fields: Definition of Invertebrates , Characteristics of Invertebrates, Classification of Invertebrates .Instruction. Protozoa invertebrats. Platyhelmenthes and arthropoda. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

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

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Characteristics of Invertebrates.
Week 2	Classification of Invertebrates.
Week 3	Importance of Invertebrates.
Week 4	Protozoan Phyla: Characteristics of Protozoan Phyla *Amoeba Proteus*
Week 5	Phylum Porifera General Characteristics of Porifera.
Week 6	Classification of Phylum Porifera : Canal Systems in Sponges
Week 7	Phylum Cnidaria or Coelenterata General Characteristics of Cnidaria
Week 8	Classification of Phylum Cnidaria Hydra
Week 9	Pseudocoelomates General Characteristics of Pseudocoelomates
Week 10	Phylum Rotifera or Rotatoria General Characteristics of Phylum Rotifera : Classification of Phylum Rotifera Brachionus rubens
Week 11	Phylum Annelida General Characteristics of Phylum Annelida :
Week 12	Classification of Phylum Annelida Nereis
Week 13	PHYLUM ARTHROPODA General characteristics of phylum Arthropoda Classification of Phylum Arthropoda Astacus
Week 14	PHYLUM Mollusca General characteristics of phylum Mollusca
Week 15	Phylum Echinodermata General characteristics of Phylum Echinodermata Classification of phylum Echinodermata Asterias (Seastar or Starfish)

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction of Invertebrates.
Week 2	Lab 2: Protozoa.

Week 3	Lab 3: Didinium, stentor.
Week 4	Lab 4: Noctiluca.
Week 5	Lab 5: Foraminifira,leucosolenia.
Week 6	Lab 6: Spicules.
Week 7	Lab 7: Spongin fibers.
Week 8	Lab 8: Gemmules.
Week 9	Lab9: Coelenterata.
Week10	Lab 10: Hydra.
Week 11	Lab 11: Obelia,Medosa.
Week 12	Lab 12: Physalia.
Week 13	Lab 13: Aurelia,Metridium,Tubipora.
Week 14	Lab 14: Nereis,Hirud.
Week 15	Lab 15: Arthropoda.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Barnes, R.S., et al., (2009) The Invertebrates: A synthesis. Third edition.**	Yes
Recommended Texts	**House, M.R. (1979) The Origin of major Invertebrate groups.**	Yes
Websites	https://www.britannica.com/animal/invertebrate https://www.nationalgeographic.com/animals/invertebrates	

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

Module Information معلومات المادة الدراسية					
Module Title	**Biochemistry1**		**Module Delivery**		
Module Type	**Core**		☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**		
Module Code	**Bio-23011**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	2		**Semester of Delivery**	3	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. Haitham Luqman Shihab Al-Hayali		**e-mail**	haysbio68@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Thaer Mohamed Hasan Eman Sameer		**e-mail**	thasbio42@uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**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 Objectives أهداف المادة الدراسية	This study aims 1. Communicate biological information to students about the basic biological and molecular components of a cell . 2. Methods of measuring and conducting laboratory chemical tests . 3. Keeping up with the development that is happening in the world of laboratory materials and equipment.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Giving the student the most important basics of biochemistry and understanding the biological interactions that take place within the biological system 2. The student's understanding of the most important biological components inside the body, such as sugars, proteins, fats, their components and their interactions 3. Giving a clear picture of the most important metabolic reactions that occur to the biological components inside the body. 4. Teaching students how to deal with laboratory tools correctly and safely and how to prevent them from damage 5. The student practically understood how to detect the types of carbohydrates and the most important tests related to carbohydrates. 6. 3-Detecting practically amino acids and proteins and understanding how to distinguish between amino acids
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Principle of biochemistry , water. Buffers and pH. Carbohydrates composition. Carbohydrates functions.[*15* hrs] , Types of amino acids, their composition. Amino acids reactions. Proteins structures, types .Proteins reactions. Lipids classification. Lipids functions. Fatty acids, saturated. Unsaturated fatty acids [*8* hrs] Metabolism reactions . Glycolysis reaction .Proteins metabolism.[*18*hrs] Revision problem classes [3 hrs] Part B – Practical labs Quantitative test for carbohydrates, Molish's test. Bendict's test, Barfoed's. Selivanoff 's test, Bial's test. Hydrolysis of carbohydrates. Hydrolysis of disaccharides reactions. Hydrolysis of polysaccharides. [16hrs] Proteins have many functions and shapes. Types of proteins. Ninhydrin test, Hopkincole reaction or glyoxylic acid reaction. Millon test, Xanthoprotic test. Sakaguchi test, Lead acetate test. Biurret test, Proteins extraction . Spectrophotometric method, Biuret method, lowry (Folin) method، Lipids, Fatty acids, Lipids classification, Acroleine test, Unsaturated test, Acid valu ، Iodine number, Estimation of reducing sugar by nelson. [20 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents. Students do study the following fields: Principles of biochemistry. Water formula, reactions, and buffers. chemical composition of carbohydrates, and their reactions . Amino acids and proteins. lipids ,chemical composition and reactions. metabolism of carbohydrates and proteins. The most important tests adopted in the detection of sugars and their types. Study the tests used for detection of proteins and amino acids and their most important properties and how to differentiate between nucleic acids Amino acids and proteins. prepare the cellular extract and measuring the protein concentration in the extract metabolism of carbohydrates and proteins. detect fats in the laboratory and the most important tests related to fats. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Principle of biochemistry , water.
Week 2	Buffers and pH.
Week 3	Carbohydrates composition .
Week 4	Carbohydrates functions.
Week 5	Types of amino acids, their composition .
Week 6	Amino acids reactions.
Week 7	Proteins structures, types .
Week 8	Proteins reactions.
Week 9	Lipids classification.
Week 10	Lipids functions.
Week 11	Fatty acids, saturated.
Week 12	Unsaturated fatty acids
Week 13	Metabolism reactions
Week 14	Glycolysis reaction
Week 15	Proteins metabolism.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Quantitative test for carbohydrates, Molish's test.
Week 2	Lab 2: Bendict's test, Barfoed's.
Week 3	Lab 3: Selivanoff 's test, Bial's test.
Week 4	Lab 4: Hydrolysis of carbohydrates.
Week 5	Lab 5: Hydrolysis of disaccharides reactions.
Week 6	Lab 6: Hydrolysis of polysaccharides.
Week 7	Lab 7: Proteins have many functions and shapes.
Week 8	Lab 8:. Types of proteins.

Week 9	Lab9: Ninhydrin test, Hopkincole reaction or glyoxylic acid reaction.
Week10	Lab 10: Millon test, Xanthoprotic test.
Week 11	Lab 11: Sakaguchi test, Lead acetate test.
Week 12	Lab 12: Biurret test, Proteins extraction.
Week 13	Lab 13: Spectrophotometric method, Biuret method, lowry (Folin) method,
Week 14	Lab 14: Lipids, Fatty acids, Lipids classification, Acroleine test, Unsaturated test, Acid valu,
Week 15	Lab 15: Iodine number, Estimation of reducing sugar by nelson.

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Al-jebory, A. and Al-salman, T. (2015).** Practical Biochemistry. College of pharmacy \ University of Babylon. **Murray, R. K., Bender, D.A., BothamEI, K.M., Kennelly, P.J., Rodwell, V.W., Weil, P.A.(2016).** Harper,s Illustrated Biochemistry .29th edition. The Mc GRAW-Hill Companies, USA.	Yes Yes
Recommended Texts	**Murray, R. K., Bender, D.A., BothamEI, K.M., Kennelly, P.J., Rodwell, V.W., Weil, P.A. (2016). Harper,s Illustrated Biochemistry .29th edition. The Mc GRAW-Hill Companies, USA.**	Yes
Websites	https://www.acs.org/careers/chemical-sciences/areas/biochemistry.html https://www.britannica.com/science/biochemistry	

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

Module Information معلومات المادة الدراسية					
Module Title	**Microbiology1**			**Module Delivery**	
Module Type	**Core**			☒Theory ☐ Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	**Bio-23012**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	2		**Semester of Delivery**	3	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. Khansaa Younis Mohammed		**e-mail**	Kansbio50@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Sahar Salim Al-Nakkar Ashwaq Hazim		**e-mail**	saharsalim@uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**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 Objectives أهداف المادة الدراسية	This study aims to: 1. Giving information to the student regarding the origins of microbiology. 2. Defining the types of microorganisms. 3. Studying the composition of internal and external microorganisms. 4. Branches of microbiology.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Students were able to learn the latest information on microorganisms. 2. The student should know the most important terms related to the subject. 3. The student should understand the most important methods of isolating microorganisms. 4. The student should know the important and distinctive characteristics of microorganisms. 5. Identifying "bacteria" by studying the types of microscopes used and then examining them in their natural form under a light microscope. This is followed by the use of different staining methods to examine the cellular structures.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures General Introduction. Classification of microorganisms . Prokaryotes , Eukaryote . General characteristics and types of Prokaryotic and Eukaryotic microorganisms. The impact of microorganisms on humans. [*8*hrs] The prokaryotic cell: size, shape, and arrangement. Prokaryotic cell structure : External cell structures:Appendages- :Flagella, Function of Flagella - .Axial Filaments (Periplasmic Flagella -.(Archaeal Flagella. External cell structures: Appendages: Fimbriae , Function of Fimbriae .Pili, types of Pili , and function. The bacterial surface coating or glycocalyx. Specialized functions of the glycocalyx .Biofilm. [*10* hrs] The Cell Envelope, The Cell Wall, The major functions of the cell wall are: Composition and Characteristics. Gram-Positive Cell Walls , Gram-Negative Cell Walls. Atypical Cell Walls: The cells have no walls, Acid-Fast Cell Walls . Archaeal Cell Walls . The Plasma (Cytoplasmic) Membrane. Functions of the Cell Membrane. The Movement of Materials across Membranes. Archaeal Plasma Membranes. [*10* hrs] Cytoplasm. Inclusions. The Bacterial Cytoskeleton. Ribosomes . Chromosomes and Plasmids Endospores. Structure of the endospore. Chemical composition of endospores: Properties of endospores. Germination. [8 hrs] Revision problem classes [3 hrs] Part B – Practical labs Disadvantages of bacteria. Advantages of bacteria. Types of Microscopes. Introduction on Bacteria . Bacterial smear preparation. Bacterial smear preparation. Bacterial staining . Simple stain . Gram stain . [18 hrs] Capsule stain. Spore stain . Acid-Fast stain. Motility tests. Sterilization Methods. Part 1 Disinfection Methods. Part 1. Culture media. part 1. [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents. Second grade students gradually become more interested in practical microbiology lab work . Once they learn the safety rules in microbiology they start to be cooperative and enjoy group work . Most of them have not seen or handle bacteria, this makes them ask and discuss the results in details. Videos and tutorials help a lot in staining methods and other lab experiments . Lecturers usually focus on sterilization ,disinfection and keeping the lab clean to avoid accidents . In some cases students are asked to prepare illustrated teaching aids in microbiology subjects. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	General Introduction. Classification of microorganisms.
Week 2	Prokaryotes , Eukaryotes. General characteristics and types of Prokaryotic and Eukaryotic microorganisms.
Week 3	The impact of microorganisms on humans. The prokaryotic cell: size, shape, and arrangement .
Week 4	Prokaryotic cell structure: External cell structures: Appendages: -Flagella, Function of Flagella. - Axial Filaments (Periplasmic Flagella). - Archaeal Flagella.
Week 5	External cell structures: - Appendages: - Fimbriae , Function of Fimbriae. - Pili, types of Pili , and function.
Week 6	The bacterial surface coating or glycocalyx. Specialized functions of the glycocalyx. Biofilm.
Week 7	The Cell Envelope - The Cell Wall The major functions of the cell wall are:
Week 8	Composition and Characteristics. Gram-Positive Cell Walls Gram-Negative Cell Walls
Week 9	Atypical Cell Walls: The cells have no walls, Acid-Fast Cell Walls. • Archaeal Cell Walls
Week 10	The Plasma (Cytoplasmic) Membrane. Functions of the Cell Membrane.
Week 11	The Movement of Materials across Membranes. Archaeal Plasma Membranes. Cytoplasm.
Week 12	Inclusions. The Bacterial Cytoskeleton. Ribosomes
Week 13	Chromosomes and Plasmids
Week 14	Endospores

	Structure of the endospore. Chemical composition of endospores:
Week 15	Properties of endospores. Germination.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Disadvantages of bacteria.
Week 2	Lab 2: Advantages of bacteria.
Week 3	Lab 3: Types of Microscopes.
Week 4	Lab 4: Introduction on Bacteria . Bacterial smear preparation.
Week 5	Lab 5: Bacterial smear preparation.
Week 6	Lab 6: Bacterial staining
Week 7	Lab 7: Simple stain
Week 8	Lab 8:. Gram stain .
Week 9	Lab9: Capsule stain
Week10	Lab 10: Spore stain.
Week 11	Lab 11: Acid-Fast stain
Week 12	Lab 12: Motility tests.
Week 13	Lab 13: Sterilization Methods. Part 1
Week 14	Lab 14: Disinfection Methods. Part 1
Week 15	Lab 15: Culture media. part 1

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Procop, G. W., Church, D. L., Hall, G. S., & Janda, W. M. (2020). Koneman's color atlas and textbook of diagnostic microbiology. Jones & Bartlett Publishers.** **Tortora, G. J., Funke, B. R., & Case, C. L. (2015). Microbiology: an introduction. Pearson Higher Ed.** **Talaro, K., Chess, B., Wiersema, D. S., & Sen, P. (2013). *Foundations in Microbiology, 2012*. McGraw-Hill.** **Madigan, M. T., Clark, D. P., Stahl, D., & Martinko, J. M. (2010). Brock biology of microorganisms 13th edition. Benjamin Cummings.**	Yes Yes Yes Yes
Recommended Texts	**Microbiology : A laboratory Manual 12 th edition . Pearson .2th edition.** **General Microbiology lab Manual . memoir . 2018.**	Yes
Websites	https://faculty.ksu.edu.sa/sites/default/files/140_mbio-final_notes.pdf https://rlmc.edu.pk/themes/images/gallery/library/books/Microbiology/Text_Book_of_Microbiology.pdf	

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

Module Information معلومات المادة الدراسية					
Module Title	**Entomology II**			**Module Delivery**	
Module Type	**Core**			☒Theory ☒ Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	**Bio-24113**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	2		**Semester of Delivery**	4	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. Muneef Abid Mustafa		**e-mail**	munsbio6@uomosul.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Aulfat tahseen Ammar Ghanim Younis Ibraheem		**e-mail**	**Alfsbio76@uomosul.edu.iq** **Amrksbio100@uomosul.edu.iq**	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Entomology 1	**Semester**	3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	This study aims 1. Enable the student to identify arthropods. 2. The most important people that it includes. 3. Expand with the insect class and identify the external and internal morphological characteristics of insects. 4. Know the taxonomic position of insects. 5. Classification methods using taxonomic records.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. students learn how to collect the insect and keep their Samples of insects in alcoholic solution 2. students get knowledge about the classification of insects , when they saw any insect they will be know anything about it 3. student learn how to dry insects and make painting of dried insects
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> Introduction in Entomology, Structure of Nervous System part,Structure of Nervous System part ,Endocrine System part 1,Endocrine System part 2. [*15*hrs] Morphogeneseis part 1, Morphogeneseis part 2, Molting part 1, Molting part 2, senses part 1, senses part 2. [*10* hrs] P Communication part 1. Communication part 2,Taxonomy part 1,Taxonomy part 2. [*8*hrs] Revision problem classes [3 hrs] <u>Part B – Practical labs</u> Abdominal appendages , metamorphosis Classification of insect-thysanura,collembolan Odonata, Dermaptera. Orthoptera , Dictyoptera. Mallophage , anoplura [18 hrs] Ephemeroptera , hemiptera. Homoptera , thysanoptera , isopteran. Hymenoptera , diptera , Lepidoptera. [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents. Various techniques were used such as. Data show , Microscope, Posters , Samples of insects keep in alcoholic solution . Students do study the following fields: Abdominal appendages and metamorphosis of insects. Classification of insect. Pterygota and apterygota, Exopterygota and endopterygota. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	22	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

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

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction in Entomology.
Week 2	Structure of Nervous System part 1
Week 3	Structure of Nervous System part 2
Week 4	Endocrine System part 1
Week 5	Endocrine System part 2
Week 6	Morphogeneseis part 1
Week 7	Morphogeneseis part 2
Week 8	Molting part 1
Week 9	Molting part 2
Week 10	senses part 1
Week 11	senses part 2
Week 12	Communication part 1
Week 13	Communication part 2
Week 14	Taxonomy part 1
Week 15	Taxonomy part 2

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Abdominal appendages
Week 2	Lab 2: metamorphosis
Week 3	Lab 3: Classification of insect-thysanura
Week 4	Lab 4: collembola
Week 5	Lab 5: Odonata
Week 6	Lab 6: Dermaptera
Week 7	Lab 7: Dictyoptera
Week 8	Lab 8: Orthoptera
Week 9	Lab 9: Mallophage

Week10	Lab 10: anoplura
Week11	Lab11: Ephemeroptera
Week 12	Lab 12: hemiptera
Week 13	Lab 13: Homoptera + thysanoptera + isoptera
Week 14	Lab 14: Hymenoptera
Week 15	Lab 15: diptera + lepidoptera

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**The Insects: Structure and Function , R. F. Chapman - Fifth Edition , Published by Cambridge University Press, 2013**	Yes
	AN OUTLINE OF ENTOMOLOGY P.J. Gullan and P.S. Cranston, 2014 .	Yes
	Chapman, R.F. (1998). " The Insects Structureand Function " Ed[4]. English Universities Press LTD.	Yes
	Eldridge, B.F. and Edman, J.D. (2012). "Medical Entomology". Kluwer Academic Publishers.	Yes
Recommended Texts	**Nesbit, C. and Nesbit, A. (2017). "Insecta" teNeues Publishing Company, 220 pages .**	No
	Richards, O.W. and Davies, R.G. (1973). "Entomology". London:Chapman and Hall LTD.	Yes
	Prakash, A. (2001). "Laboratory Manual of Entomology" . Published by K.K. Gupta for New Age International (P) LTD. NewDelhi, India.	Yes
Websites	https://www.royensoc.co.uk/understanding-insects/what-is-entomology/ https://naturalhistory.si.edu/research/entomology	

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

Module Information معلومات المادة الدراسية					
Module Title	**Plant Taxonomy**			**Module Delivery**	
Module Type	**Core**			☒Theory ☒ Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	**Bio-24114**				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level		2	**Semester of Delivery**		4
Administering Department		Bio	**College**	Sci	
Module Leader	Dr. May Taha Hamid		**e-mail**	mayasbio44@uomosul.edu.iq	
Module Leader's Acad. Title		lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor	Dr. Zakaria Sami Abdul-razzaq Ali Ahmad Ali Abeer Ahmad		**e-mail**	zaksbio67@uomosul.edu.iq alisbio107@uomosul.edu.iq	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		1/10/2024	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Plant Anatomy	**Semester**	3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	This study aims 1. Introduce the student to the principles of modern plant taxonomy (Phylogentic classification) which based on a set of taxonomical evidence (comparative Morphology, comparative Anatomy, Cytological taxonomy, etc.) 2. Demonstrate how to use the taxonomic evidence in designing taxonomical keys to distinguish between different plant taxa.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**1. 1. Students became able to understand nature of higher plants.** **2. 2.Helping students to identify plants.** 3. **3. Encourage the students to improve skills of sampling & diagnosing of higher plants.**
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> Introduction to plant taxonomy; its characters and relation with other sciences. Basic principles, & Functions of the of taxonomy. [8 hrs] Types of taxonomy; Types of classification systems. Taxonomy of living organisms; taxonomy of Plant kingdom.Characters of scientific names; International Codes of Botanical Nomenclature & their principles; nomenclatural type . [*10* hrs] The terms that used in the description of vegetative organs (Roots, Stems, & Leaves.(The typical flower؛ Position of the ovary؛ Aestivation. Androecium؛ Gynoecium; Symmetry of flowers & Placentation:؛ [*8* hrs] Inflorescence (component & types؛(floral Diagram.: Inflorescence (component & types(Floral Modifications And Inflorescences .The Fruits Types [*10* hrs] Revision problem classes [3 hrs] <u>Part B – Practical labs</u> General Terms used in plant Taxonomy .classification of plants depending on habit. classification of plants depending on environments. The Root in Plants , types of root , modification of roots. The stem in Plants , types of stem in plants ، modifications of stem in plants. The leaves in plants , simple & compound leaves ,types of leaves in plants ،modifications of leaves in plants.Flowers in plants. The Seeds (component & types); Pollen grain & pollination. [20 hrs] . Taxonomy of Plant kingdom; Characters of Seed plants. Gymnospermae (general characters, taxonomy, example family pinaceae.(Angyospermae (general characters, taxonomy, example.(Examples on monocotyledons families. Examples on dicotyledons families.[16 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents. Teaching Techniques: Powerpoint presentations, videos and tutorials. Students do study the following fields: Higher Plants structures. Taxonomic systems . Higher & Lower taxonomic levels . Studying of the most common plants families . This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	22	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

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

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction to plant taxonomy; its characters and relation with other sciences.
Week 2	Basic principles, & Functions of the of taxonomy.
Week 3	Types of taxonomy; Types of classification systems.
Week 4	Taxonomy of living organisms; taxonomy of Plant kingdom.
Week 5	Characters of scientific names; International Codes of Botanical Nomenclature & their principles; nomenclatural type.
Week 6	The terms that used in the description of vegetative organs (Roots, Stems, & Leaves).
Week 7	The typical flower;
Week 8	Position of the ovary;
Week 9	Aestivation.
Week 10	Androecium;
Week 11	Gynoecium; Symmetry of flowers & Placentation;:
Week 12	Inflorescence (component & types);
Week 13	floral Diagram.: Inflorescence (component & types)
Week 14	Floral Modifications And Inflorescences
Week 15	The Fruits Types

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: General Terms used in plant Taxonomy.
Week 2	Lab 2: classification of plants depending on habit.
Week 3	Lab 3: classification of plants depending on environments .
Week 4	Lab 4: The Root in Plants , types of root , modification of roots .
Week 5	Lab 5: The stem in Plants , types of stem in plants ,
Week 6	Lab 6: modifications of stem in plants.
Week 7	Lab 7: The leaves in plants , simple & compound leaves ,types of leaves in plants,
Week 8	Lab 8:. modifications of leaves in plants.

Week 9	Lab9: Flowers in plants
Week10	Lab 10: The Seeds (component & types); Pollen grain & pollination.
Week 11	Lab 11: Taxonomy of Plant kingdom; Characters of Seed plants.
Week 12	Lab 12: Gymnospermae (general characters, taxonomy, example family pinaceae).
Week 13	Lab 13: Angyospermae (general characters, taxonomy, example).
Week 14	Lab 14: Examples on monocotyledons families.
Week 15	Lab 15: Examples on dicotyledons families

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	(1) Judd et al. (2007) Plant Systematics: A phylogenetic approach, Third Edition. Sinauer Associates. (2) Laboratory Manual, available as a pdf from your instructors. (3) Optional: Castner, J. Photographic Atlas of Botany. (obtained through lab)	Yes Yes Yes
Recommended Texts	**OP Sharma PlantTaxonomy 1993 Advance Plant Taxonomy Morphology to Molicules Bot 521 M.Ajmal. Ali**	Yes
Websites	https://botanicalsociety.org.za/the-science-of-names-an-introduction-to-plant-taxonomy https://letstalkscience.ca/educational-resources/backgrounders/plant-taxonomy	

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

Module Information معلومات المادة الدراسية					
Module Title	**Parasitology**			**Module Delivery**	
Module Type	**Core**			☒Theory ☒Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	**Bio-24115**				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level	2		**Semester of Delivery**	4	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. Najah Subhi Nayef		**e-mail**	Najahsobhi@gmail.com	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Senaa Abdullah Ali Fulk Abdulhafedh Raja Abdulrahman		**e-mail**	**sensbio23@uomosul.edu.iq** **fulk7676khattab@gmail.com**	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Invertebrates	**Semester**	3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	This study aims: 1. Communicate information about parasitology to students. 2. Focusing on important parasites, especially those that infect humans and economic animals. 3. How to diagnose parasites. 4. Methods of transmission to humans and prevention.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. To enable students to understand the topic of parasites. 2. To familiarize the student with the terminology related to the subject of parasites. 3. The student learns how to diagnose parasites and ways to prevent them .
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Introduction in Parasitology. Types of Animal associations Types of Parasite .Types of Hosts. Subkingdom- Protozoa. Phylum: Sarcomastigophora, Class: Sarcodina, Subphylum : Mastigophora. Class :Zoomastigophora, The Flagellate, Hemoflagellates, Genus :Trypanosoma. . [*14*hrs] Ph: ciliophora: Or :Trichomastida , Balantidium coli. Ph: Apicomplexa, Class: sporozoa ,Subcl: coccidian . Sub or: Haemosporina Genus : Plasmodium. [*12*hrs] Heleminths – general ,Phylum :Platyhelminthes , Cl: Trematoda , Intestinal flukes, Or : Cyclophyllidea, Genus :Taenia , Hymenolepis, Somatic cestodes, Genus :Echinococcus (E.granulosus). [*18* hrs] Revision problem classes [3 hrs] Part B – Practical labs Introduction of practical parasitology .Protozoa. Endolimax nana ,Iodamoeba butchlii. Entamoeba coli, CIliophora. Intestenal flagellates ,Gardia lambli . Atrial flagellat,Trickomonas vaginalis. Blood and tissue flagellates.Leishmania ,Trypanosoma.[18 hrs] Sporozoa,Plasmodium,Platyhlminthes. Diphyllobothrium latum. Taenia saginata,Taenia solium .Echinococcus granulosus. Trematoda,Fasciola hepatica,Fasciolopsis buski Schistosomatidae..Nemathelminthes. [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents. Various techniques were used such as. Data show , Microscope, Posters , Samples keep in alcoholic solution. Students do study the following fields: Instruction. Kingdom of protozoa .Platyhelmenthes .Types of Animal associations. Types of Parasite .Types of Hosts . Protozoa and Heleminths. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	22	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

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

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction in Parasitology
Week 2	Types of Animal associations Types of Parasite. Types of Hosts
Week 3	Subkingdom- Protozoa
Week 4	Phylum: Sarcomastigophora. Class: Sarcodina
Week 5	Subphylum : Mastigophora.
Week 6	Class :Zoomastigophora The Flagellate
Week 7	Hemoflagellates
Week 8	Genus :Trypanosoma
Week 9	Ph: ciliophora : Or :Trichomastida
Week 10	*Balantidium coli*
Week 11	Ph: Apicomplexa Class: sporozoa Subcl: coccidian
Week 12	Sub or: Haemosporina Genus *: Plasmodium*
Week 13	Heleminths – general Phylum :Platyhelminthes Cl: Trematoda Intestinal flukes
Week 14	Or : Cyclophyllidea Genus :*Taenia , Hymenolepis*
Week 15	Somatic cestodes Genus :Echinococcus (*E.granulosus*)

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction of practical parasitology.
Week 2	Lab 2: Protozoa.
Week 3	Lab 3: *Endolimax nana ,Iodamoeba butchlii*.

Week 4	Lab 4: *Entamoeba coli,* CIliophora.
Week 5	Lab 5: Intestenal flagellates ,*Gardia lambli*
Week 6	Lab 6: Atrial flagellat,*Trickomonas vaginalis*
Week 7	Lab 7: Blood and tissue flagellates
Week 8	Lab 8: *Leishmania ,Trypanosoma*
Week 9	Lab9: Sporozoa,*Plasmodium,Platyhlminthes.*
Week10	Lab 10: *Diphyllobothrium latum*
Week 11	Lab 11: Taenia saginata,Taenia solium.
Week 12	Lab 12: Echinococcus granulosus.
Week 13	Lab 13: Trematoda,Fasciola hepatica,Fasciolopsis buski
Week 14	Lab 14: Schistosomatidae.
Week 15	Lab 15: Nemathelminthes.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Arora, D.R.(2012).**Medical Parasitology**.**third ed .India. **Paniker ,J.CK.(2007).**Textbook of Medical Parasitology; 6th ed. Jaypee Brothers Medical Publisher .new Delhi.	Yes
Recommended Texts	**Robert,L.S.** and **Janovy,j.(1996).** Foundations of Parasitology. Fifth Edition .Wm.C.Brown Publishers.	Yes
Websites	https://www.nature.com/subjects/parasitology https://apps.who.int/iris/handle/10665/40793	

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

Module Information معلومات المادة الدراسية					
Module Title	**Biochemistry II**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Bio-24116**				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level	2		**Semester of Delivery**	4	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. Haitham Luqman Shihab Al-Hayali		**e-mail**	haysbio68@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Thaer Mohamed Hasan Eman Sameer		**e-mail**	thasbio42@uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Biochemistry 1	**Semester**	3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	This study aims 1. Communicate biological information to students about the basic biological and molecular components of a cell . 2. Methods of measuring and conducting laboratory chemical tests . 3. Keeping up with the development that is happening in the world of laboratory materials and equipment.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Students' understanding of the synthesis of nucleotides and how ribose sugar and purine or pyrimidine base are associated with the phosphate group 2. The structure of DNA and RNA and its role in transferring genetic information and building proteins 3. Understand the fundamentals of enzymes, their chemical structure and their role in stimulating chemical reactions within the body
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Nucleotides and their synthesis. Synthesis of Nucleotides. Chemistry of purines. Chemistry of pyrimidines. Nucleic acids. Nucleic acids components. Nucleotides Absorb Ultraviolet Light. DNA structure, DNA replication. [*14* hrs] protein-synthesizing, Nucleic acids levels. Nucleotides serve divers physiological function. Cyclic nucleotide. [*8* hrs] DNA Contains the Genetic Information. Used DNA to create proteins.RNA Synthesis. Messenger RNA (mRNA(. Transfer RNA (tRNA).[*14*hrs] Revision problem classes [3 hrs] Part B – Practical labs Blood composition, Functions of blood .Centrifugation, Anticoagulant, Blood collection and handling, Calorimetric analysis, Spectrophotometer, Light intensity and Beer's law, The normal value. Determination of serum glucose, Insulin, Glucagon . Determination of Growth hormones (GH) and Adrenocortic trophic(ACTH), Hydrocortisone Hormone. Determination of total serum protein concentration, Blood proteins functions, The normal value of serum protein, Hyperproteinemia, Hypoperteinemia. Methods for determination of serum protein concentration. [18 hrs] Determination of serum cholesterol concentration .The source and metabolism of cholesterol as the following. How cholesterol is transported in the blood. The normal value of blood cholesterol. Determination of serum urea concentration. The normal value of blood urea. The removing of urea. Clinical significance of urea. Determination of serum creatinine concentration. The normal value of blood creatinine. Clinical Significance of Creatinine. Natural concentration of creatine. Determination of creatinine concentration in serum. [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents.Students do study the following fields: Nucleotides and their chemical composition. DNA, RNA, structure, reactions and their role in transferring genetic information and building proteins. DNA replications and Translation and reproduction process. Basics of enzymes, their composition, types, and role in stimulating chemical reactions . Principles of Practical Clinical Chemistry .Blood components, and get blood serum . Study the natural biological components inside the body such as blood sugar, proteins, cholesterol, creatinine and others and know their natural concentrations inside the body and pathological conditions that result from the increase or decrease of these biological components. Study the most important practical tests adopted in estimating the percentage of different biological components. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	22	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

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

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Nucleotides and their synthesis.
Week 2	Synthesis of Nucleotides.
Week 3	Chemistry of purines.
Week 4	Chemistry of pyrimidines.
Week 5	Nucleic acids.
Week 6	Nucleic acids components.
Week 7	Nucleotides Absorb Ultraviolet Light
Week 8	DNA structure, DNA replication
Week 9	protein-synthesizing, Nucleic acids levels.
Week 10	Nucleotides serve divers physiological function
Week 11	Cyclic nucleotide
Week 12	DNA Contains the Genetic Information
Week 13	Used DNA to create proteins
Week 14	RNA Synthesis
Week 15	Messenger RNA (mRNA) Transfer RNA (tRNA)

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Blood composition, Functions of blood.
Week 2	Lab 2: Centrifugation, Anticoagulant, Blood collection and handling, Calorimetric analysis, Spectrophotometer, Light intensity and Beer's law, The normal value.
Week 3	Lab 3: Determination of serum glucose, Insulin, Glucagon .
Week 4	Lab 4: Determination of Growth hormones (GH) and Adrenocortic trophic(ACTH), Hydrocortisone Hormone.
Week 5	Lab 5: Determination of total serum protein concentration, Blood proteins functions, The normal value of serum protein, Hyperproteinemia, Hypoperteinemia.

Week 6	Lab 6: Methods for determination of serum protein concentration.
Week 7	Lab 7: Determination of serum cholesterol concentration. - The source and metabolism of cholesterol as the following.
Week 8	Lab 8: How cholesterol is transported in the blood.
Week 9	Lab9: The normal value of blood cholesterol.
Week10	Lab 10: Determination of serum urea concentration.
Week 11	Lab 11: The normal value of blood urea. - The removing of urea.
Week 12	Lab 12: - Clinical significance of urea.
Week 13	Lab 13: Determination of serum creatinine concentration.
Week 14	Lab 14: The normal value of blood creatinine. Clinical Significance of Creatinine.
Week 15	Lab 15: Natural concentration of creatine. - Determination of creatinine concentration in serum.

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Al-jebory, A. and Al-salman, T. (2015).** Practical Biochemistry. College of pharmacy \ University of Babylon. **Murray, R. K., Bender, D.A., BothamEI, K.M., Kennelly, P.J., Rodwell, V.W., Weil, P.A.(2016).** Harper,s Illustrated Biochemistry .29th edition. The Mc GRAW-Hill Companies, USA.	Yes Yes
Recommended Texts	**Murray, R. K., Bender, D.A., BothamEI, K.M., Kennelly, P.J., Rodwell, V.W., Weil, P.A. (2016). Harper,s Illustrated Biochemistry .29th edition. The Mc GRAW-Hill Companies, USA.**	Yes
Websites	https://www.genome.gov/genetics-glossary/Nucleic-Acids https://www.sciencedirect.com/topics/biochemistry-genetics-and-molecular-biology/nucleic-acid	

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

Module Information معلومات المادة الدراسية					
Module Title	**Microbiology II**			**Module Delivery**	
Module Type	**Core**			☒Theory ☒Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	**Bio-24117**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	2		**Semester of Delivery**	4	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. Khansaa Younis Mohammed		**e-mail**	Kansbio50@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Sahar Salim Al-Nakkar Ashwaq Hazim		**e-mail**	saharsalim@uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Microbiology 1	**Semester**	3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	This study aims to: 1. Giving primary information to the student regarding methods of feeding microorganisms. 2. The factors affecting its growth. 3. Methods of controlling it, whether biological, chemical, physical or mechanical. 4. In addition to giving the student preliminary information on the pathogenicity of bacteria. 5. Giving the student preliminary information in immunity. 6. Giving the student preliminary information in Biotechnology.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	From the study of this subject: 1. Students were able to learn the cell bacterial cycle. 2. The student should know the most important terms related to the subject. 3. By studying the student's immunity, he was able to understand the human immune system and the mechanisms of his work. 4. Encouraging students to develop their scientific skills in the medical laboratories. 5. Encourage students to discuss various problems about antibacterial drug resistances and how to deal with these bacterial strains. 6. Develops the students own skills to deal with bacterial genetic material . 7. Biotechnology. 8. Studying many methods of sterilization and disinfection. 9. Studying methods of counting bacteria cells (measuring the amount of growth) and conducting experiments on them. 10. Studying the types of culture media, how to prepare them, and identifying ways to isolate and inoculate bacteria. 11. Studying the types of biochemical tests and diagnosing bacteria.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Nutrition of Microorganisms. Nutritional types of microorganisms. Culture media Microbial Growth Cycle . Bacterial Cell Division .Cell Growth and Binary Fission. Population Growth. Essentials of Catabolism .Influence of environmental factors of growth , Temperature, Acidity and Alkalinity, Osmotic Effects, Oxygen, Pressure, Radiation.[*10* hrs] Microbial Growth Control. Physical Antimicrobial Control. Heat Sterilization, Radiation Sterilization, Filter Sterilization. Biological control of microorganisms. The use of mechanical methods in control: Chemical Growth Control, Antimicrobial Agents, General characteristics of antimicrobial drugs, Mechanisms of Antimicrobial Action. Antimicrobial Drug Resistance.[*8* hrs] Host – Parasite Relationships, Overview of bacterial pathogenesis, Virulence, Toxigenicity, Immunity, Cells and Organs of the Immune System, Innate Immunity,

	Adaptive Immunity, Antibodies, Inflammation. Prevention of Infectious. Allergy, Hypersensitivity.[*10* hrs] Molecular Biology of Bacteria, DNA Structure and Genetic, DNA Replication, RNA Synthesis: Transcription, Protein Structure and Synthesis. Biotechnology. [8 hrs] Revision problem classes [3 hrs] <u>Part B – Practical labs</u> Sterilization Methods. Part 2. Quantitative measurements of bacterial growth. Turbidity measurements (Spectrophotometer). McFarland's Tubes. Total (viable) count. Breed's method, Hemocytometer. Types of culture media and their preparation. Anaerobic culture methods. Kirby-Bauer antimicrobial Sensitivity Test. Influence of environmental factors of growth. Temperature, - Osmotic Effects, - Oxygen. [20 hrs] Identification of bacteria: Biochemical tests: Sugar fermentation test. Basis of biochemical tests. IMViC. Phenylalanine deaminase test, Urease test. Oxidase, Catalase. Gelatin Hydrolysis Test. Nitrate, TSI slope. Starch hydrolysis test. coagulase.[16 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents. Teaching Techniques: Powerpoint presentations, videos and tutorials. Students do study the following fields: Nutrition of Microorganisms .Bacterial Cell Division. Influence of environmental factors of growth. Microbial Growth Control. Antimicrobial Agents. Overview of bacterial pathogenesis . Immunity. Molecular Biology of Bacteria. Students are trained to perform experiments in bacterial cell counts, preparation and the purpose of many types of culture media, grow anaerobic incubation, antibiotics sensitivity testing, and routine biochemical testing for bacterial identification. Furthermore each lab results for the previous lab work are discussed. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الأسبوعي النظري

	Material Covered
Week 1	Nutrition of Microorganisms . Nutritional types of microorganisms.
Week 2	Culture media Microbial Growth Cycle
Week 3	Bacterial Cell Division Cell Growth and Binary Fission
Week 4	Population Growth Essentials of Catabolism
Week 5	Influence of environmental factors of growth

	-Temperature - Acidity and Alkalinity - Osmotic Effects
Week 6	- Oxygen - Pressure - Radiation
Week 7	Microbial Growth Control Physical Antimicrobial Control Heat Sterilization Radiation Sterilization Filter Sterilization
Week 8	Biological control of microorganisms The use of mechanical methods in control: Chemical Growth Control
Week 9	Antimicrobial Agents General characteristics of antimicrobial drugs Mechanisms of Antimicrobial Action Antimicrobial Drug Resistance
Week 10	Host – Parasite Relationships Overview of bacterial pathogenesis Virulence Toxigenicity
Week 11	Immunity Cells and Organs of the Immune System Innate Immunity Adaptive Immunity Antibodies
Week 12	Inflammation Prevention of Infectious Allergy, Hypersensitivity
Week 13	Molecular Biology of Bacteria DNA Structure and Genetic DNA Replication
Week 14	RNA Synthesis: Transcription Protein Structure and Synthesis
Week 15	Biotechnology

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Sterilization Methods. Part 2
Week 2	Lab 2: Quantitative measurements of bacterial growth. Turbidity measurements (Spectrophotometer). McFarland's Tubes. Total (viable) count.
Week 3	Lab 3: Breed's method, Hemocytometer
Week 4	Lab 4: Types of culture media and their preparation.
Week 5	Lab 5: Anaerobic culture methods.
Week 6	Lab 6: Kirby-Bauer antimicrobial Sensitivity Test.
Week 7	Lab 7: Influence of environmental factors of growth -Temperature, - Osmotic Effects, - Oxygen
Week 8	Lab 8: Identification of bacteria: Biochemical tests: Sugar fermentation test.
Week 9	Lab9: Basis of biochemical tests. IMViC
Week10	Lab 10: Phenylalanine deaminase test, Urease test
Week 11	Lab 11: Oxidase, Catalase
Week 12	Lab 12: Gelatin Hydrolysis Test
Week 13	Lab 13: Nitrate, TSI slope,
Week 14	Lab 14: Starch hydrolysis test
Week 15	Lab 15: coagulase

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Procop, G. W., Church, D. L., Hall, G. S., & Janda, W. M. (2020). Koneman's color atlas and textbook of diagnostic microbiology. Jones & Bartlett Publishers.** **Tortora, G. J., Funke, B. R., & Case, C. L. (2015). Microbiology: an introduction. Pearson Higher Ed.** **Talaro, K., Chess, B., Wiersema, D. S., & Sen, P. (2013). *Foundations in Microbiology, 2012*. McGraw-Hill.** **Madigan, M. T., Clark, D. P., Stahl, D., & Martinko, J. M. (2010). Brock biology of microorganisms 13th edition. Benjamin Cummings.**	Yes Yes Yes Yes
Recommended Texts	**Microbiology : A laboratory Manual 12 th edition . Pearson .2th edition.** **General Microbiology lab Manual . memoir . 2018.**	Yes Yes
Websites	https://uilis.usk.ac.id/oer/files/original/9d22b38fb52ce56b18b916d2f615d5e6.pdf https://www.nature.com/articles/nrmicro.2017.157	

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

Module Information معلومات المادة الدراسية					
Module Title	**Plant Groups**			**Module Delivery**	
Module Type	**Core**			☒Theory ☒ Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	**Bio-24018**				
ECTS Credits	4				
SWL (hr/sem)	**100**				
Module Level	2		**Semester of Delivery**	4	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. May Taha Hamid		**e-mail**	mayasbio44@uomosul.edu.iq	
Module Leader's Acad. Title	lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Zakaria Sami Abdul-razzaq Najlaa Tariq Abeer Ahmad		**e-mail**	Zaksbio67@uomosul.edu.iq Najtsbio79@uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**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 Objectives أهداف المادة الدراسية	This study aims 1. 1. Knowledge Development: Developing the student's ability to recall what he has learned About microorganisms that live in soil and water. 2. To improve the comprehension level and to develop the ability On interpretation, prediction and conclusion. 3. Developing applied capabilities. 4. Giving the student the ability to analyze. 5. Developing the student's ability to integrate ideas and information (level Kebaltre Synthesis (which is the opposite of parse. 6. Evaluation: Developing the student's ability to judge the value of the learned material
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. **Students became able to understand nature of lower plants.** 2. **Helping students to identify algae.** 3. **Encourage the students to improve skills of sampling & diagnosing of lower plants.**
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures **I**ntroduction To Algal Characteristics and Diversity**.** The Classification of Algae & Fundamental characteristics that depend on algae classification Vegetative Structure : Life cycles algae **.** Blue –green algae Division**.** Division Chlorophyta : Important features & 0rders& Class Chlorophyceae orders**.** [*10* hrs] , Class Charophyceae orders .Order Charales& Family Volvocaceae .& Family Zygnemataceae Family Oedogonaceae **.** Family Ulvaceae& Rhodophyta Phaeophyta**.** Xanthophyta**.** Diatomes**.** Archegonate plants [*8* hrs] Bryophyta : Habitate ,Life cycle , sexuality , evolution , Comparative Morphology Division Pterophyta (Ferns) & Division Lycpphyta**.** [*10* hrs] .Division Equisitophyta & Division Psilophyta. [8 hrs] Revision problem classes [3 hrs] Part B – Practical labs Algae definition**.**Division: Cyanophyta .Division: Chlorophyta(Volvocales**.(** Division: chlorococcales & other orders**.** Division: Xanthophyta(Vaucheriales**.(** Division: Division: Phaeophyta(Lamunariales & other orders**.(** Division: Rhodophyta(Siphoniales**.(** Archaegoniate definition**.**[20 hrs] Non-Vascular plants.- Division: Marchantiophyta. Division: Anthocerotophyta. Division: Pteridophyta Gymnosperms Angiosperms **.**Applications [16hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents. Various techniques were used such as. Data show , Microscope, Posters , Samples keep in alcoholic solution Students do study the following fields: Lower Plants Prokaryotics & eukaryoticsAlgal structures .Reproduction & life cycles of algae .Archegonats plants. Algae definition Archaegoniate definition .Identification of Algae & Archaegoniate. Classification of Algae. Classification of Archaegoniate. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	22	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

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

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction To Algal Characteristics and Diversity.
Week 2	The Classification of Algae & Fundamental characteristics that depend on algae classification
Week 3	Vegetative Structure : Life cycles algae.
Week 4	Blue –green algae Division.
Week 5	Division Chlorophyta : Important features & 0rders& Class Chlorophyceae orders .
Week 6	Class Charophyceae orders .Order Charales& Family Volvocaceae .& Family Zygnemataceae
Week 7	Family Oedogonaceae.
Week 8	Family Ulvaceae& Rhodophyta
Week 9	Phaeophyta.
Week 10	Xanthophyta.
Week 11	Diatomes.
Week 12	Archegonate plants
Week 13	Bryophyta : Habitate ,Life cycle , sexuality , evolution , Comparative Morphology
Week 14	Division Pterophyta (Ferns) & Division Lycpphyta.
Week 15	.Division Equisitophyta & Division Psilophyta.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Algae definition.
Week 2	Lab 2: Division: Cyanophyta
Week 3	Lab 3: Division: Chlorophyta(Volvocales).
Week 4	Lab 4: Division: chlorococcales & other orders.
Week 5	Lab 5: Division: Xanthophyta(Vaucheriales).
Week 6	Lab 6: Division: Division: Phaeophyta(Lamunariales & other orders).
Week 7	Lab 7: Division: Rhodophyta(Siphoniales).
Week 8	Lab 8: - Archaegoniate definition.

Week 9	Lab9: Non-Vascular plants.
Week10	Lab 10: - Division: Marchantiophyta.
Week 11	Lab 11: Division: Anthocerotophyta.
Week 12	Lab 12: Division: Pteridophyta
Week 13	Lab 13: Gymnosperms
Week 14	Lab 14: Angiosperms
Week 15	Lab 15: Applications

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Algae Anatomy, Biochemistry, & Biotechnology .**By Laura Barsanti, Paolo Gualtieri CRC Press is an imprint of Taylor & Francis Group, Boca Raton London New York. 2006.	Yes
	Phycology Fourth Edition By Robert Edward Lee Colorado State University, USA Cambridge University Press. 2008	Yes
	A biology of algae By Philip Sze McGraw-Hill College; Subsequent edition. 1997	Yes
Recommended Texts	**Plant systematics Second edition By Michael G. Simpson, Academic press, 2010**	Yes
Websites	https://www.routledge.com/Algae-Anatomy-Biochemistry-and-Biotechnology-Second-Edition/Barsanti-Gualtieri/p/book/9781439867327 https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1529-8817.2007.00335.x	

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

Module Information معلومات المادة الدراسية					
Module Title	**Soil Microbiology**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Bio2-35019**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	3		**Semester of Delivery**	5	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. Rayan Mazin		**e-mail**	rayanmazin@uomosul.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Aws Ibrahim Sulaiman		**e-mail**	awssbio61@uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**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 Objectives أهداف المادة الدراسية	This study aims 1. Know the concepts of soil microbiology. 2. Studying the economic and environmental importance of soil microbes. 3. Knowing the effect of microorganisms on the environment and the interactive effect with higher organisms. 4. Studying the role of soil organisms in the formation and erosion of soil and the cycle of carbon and nitrogen. 5. Discuss the vital relationships of water and soil microbes.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Every student be able to isolation and identification microorganisms from several habitats. 2. Every student have a knowledge about the effect of microorganisms on public health. 4. By studying the student, he was able to understand the scientific subject 5. Helping the student to master the conduct of scientific experiments and tests for the subject 6. Encouraging him to develop his scientific skills.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> I Introduction of Soil . properties of soil layers. Distribution of microorganisms1 in soil. Bacteria in soil. Virus in soil, Algae in soil. Parasite in soil. [*10* hrs] Soil borne pathogens1 Minerals cycle 1 (Carbon(Minerals Cycle 2 (Nitrogen(. Bioremediation. [*8* hrs] soil Is the Largest Microbial Habitat Aquatic Viruses: Mortality at Sea Algae: the major microbial biomass in freshwater systems Water Borne Pathogens (Virus, Parasites and Fungi.[*10* hrs] soil Borne Pathogens (Bacteria(Water Quality and Public Health. Wastewater Treatment [8 hrs] Revision problem classes [3 hrs] <u>Part B – Practical labs</u> Introduction in practical Soil Microbiology. Contact slide assay . microbial population count in soil. Bacteria and Actinomycetes . Fungi. Isolation of antibiotic producer from soil. measuring CO2 production. Algae enumeration. filament Fungi.. [18 hrs] Bacteriological examination, Coliform bacteria + E.coli.. Fecal Enterococcus. isolation the Shigella. isolation the Salmonella. isolation Vibrio cholera. isolation Pseudomonas . [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents .Students do

	study the following fields: Environmental microbiology : Soil is the Largest Microbial Habitat properties of soil layers. Distribution of microorganisms . Bacteria in soil. Virus in soil .Algae in soil. Parasite in soil . Soil borne pathogens . Minerals cycles (Carbon, Nitrogen) .Aquatic Viruses: Mortality at S. Algae: the major microbial biomass in freshwater systems .soil Borne Pathogens .Virus .Bacteria . Parasites . Water Quality and Public Health .Collection of soil samples for analysis.. Bioremediation. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction of water and Soil
Week 2	properties of soil layers.
Week 3	Distribution of microorganisms1 in soil.
Week 4	Bacteria in soil. Virus in soil, Algae in soil. Parasite in soil.
Week 5	Soil borne pathogens1
Week 6	Minerals cycle 1 (Carbon)
Week 7	Minerals Cycle 2 (Nitrogen)
Week 8	Bioremediation
Week 9	Water Is the Largest Microbial Habitat
Week 10	Aquatic Viruses: Mortality at Sea
Week 11	Algae: the major microbial biomass in freshwater systems
Week 12	Water Borne Pathogens (Virus, Parasites and Fungi)
Week 13	Water Borne Pathogens (Bacteria)
Week 14	Water Quality and Public Health.
Week 15	Wastewater Treatment

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction in practical water &Soil Microbiology.
Week 2	Lab 2: Contact slide assay.
Week 3	Lab 3: microbial population count in water & soil.
Week 4	Lab 4: Bacteria and Actinomycetes
Week 5	Lab 5: Fungi.
Week 6	Lab 6: Isolation of antibiotic producer from soil .
Week 7	Lab 7: measuring CO2 production.
Week 8	Lab 8: Algae enumeration.
Week 9	Lab9: filament Fungi.
Week10	Lab 10: Bacteriological examination of water, Coliform bacteria + E.coli.

Week 11	Lab 11: Fecal Enterococcus.
Week 12	Lab 12: isolation the Shigella.
Week 13	Lab 13: isolation the Salmonella.
Week 14	Lab 14: isolation Vibrio cholera .
Week 15	Lab 15: isolation Pseudomonas .

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Procop, G. W., Church, D. L., Hall, G. S., & Janda, W. M. (2020). Koneman's color atlas and textbook of diagnostic microbiology. Jones & Bartlett Publishers.** **Tortora, G. J., Funke, B. R., & Case, C. L. (2015). Microbiology: an introduction. Pearson Higher Ed.** **Talaro, K., Chess, B., Wiersema, D. S., & Sen, P. (2013). *Foundations in Microbiology, 2012*. McGraw-Hill.** **Madigan, M. T., Clark, D. P., Stahl, D., & Martinko, J. M. (2010). Brock biology of microorganisms 13th edition. Benjamin Cummings.**	Yes Yes
Recommended Texts	**Microbiology : A laboratory Manual 12 th edition . Pearson .2th edition.** **General Microbiology lab Manual . memoir . 2018.**	Yes
Websites	https://uomustansiriyah.edu.iq/media/lectures/6/6_2022_01_14!03_48_06_PM.pdf https://www.uomustansiriyah.edu.iq/media/lectures/6/6_2022_10_17!04_41_57_AM.pdf	

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

Module Information معلومات المادة الدراسية					
Module Title	**Histology**			**Module Delivery**	
Module Type	**Core**			☒Theory ☒ Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	**Bio2-35021**				
ECTS Credits	5				
SWL (hr/sem)	**125**				
Module Level	3		**Semester of Delivery**	5	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. Fatima Qasim Mohammed		**e-mail**	fatsbio25@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Ilham Abd Allah Ali Al-saleem		**e-mail**	elham_alsaleem@yahoo.com	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	2024ظ10ظ1		**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 Objectives أهداف المادة الدراسية	This study aims 1 . Clarify the terms related to tissues for students. 2 . Explain the main types of tissues. 3 . Study its composition. 4 . Study their functions. 5 . distinguish them from each other. 6 . Identify the location of each tissue in the different organs of the body. Keeping pace with the development in the world of histology.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1.The students could recognize the different tissue of each type 2. The students They were able to diagnose all layers of the same tissue and identify the types of cells in them 3. They could distinguish any slide of the basic tissue
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Introduction in Histology , The cell . Epithelial Tissue .The types of epithelial tissue The simple epithelial tissue. Modification in surfaces of epithelial tissues Glandular epithelial tissue. Connective Tissue Matrix of C.T and repair it.[*14* hrs] The types of connective tissue. Dense connective tissue. Cartilage. The bone (bone cells,The bone types and matrix). The bone histogenesis and repair it. Joints . The blood and its components Blood and Lymph forming organs Non-granular leukocytes, Blood Platlets. Haemopoiesis , Bone marrow.. [*10* hrs] Muscular tissues, actin, myosin ,Myofilaments. Sarcoplasmic reticulum، Myoneural junction. Cardiac muscles,Smooth muscles . Nervous tissues,neurons. Peripheral nerves. Types of nerve fibers، Neuroglia, Ganglia. [*14* hrs] Revision problem classes [3 hrs] Part B – Practical labs The simple epithelial tissue part 1. The simple epithelial tissue part 2. Stratified epithelial tissue part 1. Stratified epithelial tissue part 2. Connective tissue(Cells, Fibers). Connective tissue (Loose C. T.). Dense connective tissue. Blood. [18 hrs] Cartilage. Bone. Muscular tissue. Nerve system: the type of nerve cells. Peripheral nerve, motor end plate. nerve fiber ,spinal. Sympathetic ganglia.Cerebellum.. [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم

Strategies	Expanding students' perceptions about this science and its contents . Various techniques were used such as. Data show , Microscope, Posters . Students do study the following fields: The epithelial tissue . The connective tissue. Special connective tissue. Nerve and vascular system. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Introduction in Histology , The cell.

Week 2	Epithelial Tissue .The types of epithelial tissue The simple epithelial tissue. Modification in surfaces of epithelial tissues
Week 3	Glandular epithelial tissue. Connective Tissue Matrix of C.T and repair it.
Week 4	The types of connective tissue.
Week 5	Dense connective tissue .
Week 6	Cartilage. The bone (bone cells,The bone types and matrix)
Week 7	The bone histogenesis and repair it. Joints.
Week 8	The blood and its components Blood and Lymph forming organs
Week 9	Non-granular leukocytes, Blood Platlets.
Week 10	Haemopoiesis , Bone marrow.
Week 11	Muscular tissues,actin, myosin Myofilaments .
Week 12	Sarcoplasmic reticulum, Myoneural junction.
Week 13	Cardiac muscles,Smooth muscles.
Week 14	Nervous tissues,neurons. Peripheral nerves.
Week 15	Types of nerve fibers, Neuroglia,Ganglia.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: The simple epithelial tissue part 1.
Week 2	Lab 2: The simple epithelial tissue part 2.
Week 3	Lab 3: Stratified epithelial tissue part 1.
Week 4	Lab 4: Stratified epithelial tissue part 2.
Week 5	Lab 5: Connective tissue(Cells, Fibers).
Week 6	Lab 6: Connective tissue (Loose C. T.).
Week 7	Lab 7: Dense connective tissue .
Week 8	Lab 8: Blood.
Week 9	Lab9: Cartilage .
Week10	Lab 10: Bone.
Week 11	Lab 11: Muscular tissue .

Week 12	Lab 12: Nerve system: the type of nerve cells.
Week 13	Lab 13: Peripheral nerve, motor end plate .
Week 14	Lab 14: nerve fiber ,spinal.
Week 15	Lab 15: Sympathetic ganglia.Cerebellum.

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Schmidt, I. G. (2003).ATLAS OF HUMAN HISTOLOGY,FOURTH EDITION** **KRAUSE'S ESSENTIAL HUMAN HISTOLOGY FOR MEDICAL STUDENTS**	Yes Yes
Recommended Texts	**School of anatomy and Human Biology-The University of Western Australia.**	Yes
Websites	https://www.histologyguide.com/about-us/sorenson-atlas-of-human-histology-chapters-1-and-14.pdf https://www2.nsysu.edu.tw/Bio/images/commen/hist98.pdf	

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

Module Information معلومات المادة الدراسية					
Module Title	**Ecology**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Bio2-35022**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	3		**Semester of Delivery**	5	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. Abdulmoneim Mohammed Ali Kannah		**e-mail**	abmsbio38@gmail.com	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Mahmood Esmaeel Enas Qusay		**e-mail**	Mahmoodaljubory76@gmail.com	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**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 Objectives أهداف المادة الدراسية	This study aims 1. Provide the student with aspects of knowledge of the concepts, types and characteristics of environmental systems. 2. Providing the student with knowledge that enables him to identify the importance of environmental systems and the problems they face. 3. Enable the student to choose environmental models and use them in the study of environmental systems . 4. Providing students with positive attitudes towards preserving and protecting environmental systems . 5. Provide students with positive attitudes towards preserving and protecting environmental systems . 6. Enable the student to choose environmental models and use them in the study of environmental systems. 7. Providing students with aspects of knowledge of the concepts, types and characteristics of environmental systems. 8. The student acquires practical and applied skills based on theoretical lessons.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**1.Every student be able to knowledge about environment and how pollution it.** **2. Every student be able to chemical analysis water.** **3. The student should be able to collect and summarize useful information related to a study.** **4. The student proposes solutions to some environmental problems within the framework of protecting and preserving them.** **5 . That the student has the ability to work in a team.**
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> Introduction; Definition; Scope; Divisions. The Ecosystems (definition, characters, volume, structure). Food chains & food webs. Ecological pyramids & Energy flow; Ecological efficiency. The biogeochemical cycles. Incomplete ecosystems . [*10* hrs] Liebig law of minimum; Shelford law of tolerance. The abiotic factors:1-The Soil . 2-The water .The components of natural water (anions, cations, salts). 2-The water .The components of natural water (gases & organic matters(. Characters of the population.[*10* hrs] The biological interactions. The communities (principals of bio-communities, Concept,. classification, dominancy, stratification.(Ecological succession. Biogeography; the major distributions of plants & animals**.** [8 hrs] Revision problem classes [3 hrs] <u>Part B – Practical labs</u>

	Identifying the laboratory ecology. The Science of meteorological -1.The Science of meteorological -2. Treatment of physical properties in the water. Treatment the concentration of oxygen in the water. Treatment of alkaline water. Treatment of acidic water.[18 hrs] **Determination of productivity in a manner dissolved oxygen. Treatment the salinity of the water. Treatment of calcium and magnesium hardness in water. Treatment of total brackish water. Relations between organisms. Structure of society1. Structure of society1. Structure of the community.** [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents . Various techniques were used such as. Data show , Microscope, Posters . Student were active in our classes and interactive between them and us also. Teaching Techniques were Variety. Students do study the following fields: Introduction of ecology. Divisions of ecology. Ecosystems . Nutritional Relationships. Food Chains & Food Webs. Ecological pyramid. Environmental Productivity. Introduction of Lab. ecology .Safety in the laboratory. Identify biotic and abiotic environmental factors. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction; Definition; Scope; Divisions.
Week 2	The Ecosystems (definition, characters, volume, structure).
Week 3	Food chains & food webs.
Week 4	Ecological pyramids & Energy flow; Ecological efficiency.
Week 5	The biogeochemical cycles.
Week 6	Incomplete ecosystems
Week 7	Liebig law of minimum; Shelford law of tolerance.
Week 8	The abiotic factors:1-The Soil.
Week 9	2-The water The components of natural water (anions, cations, salts,)
Week 10	2-The water The components of natural water (gases & organic matters)
Week 11	Characters of the population.
Week 12	The biological interactions
Week 13	The communities (principals of bio-communities, Concept, classification, dominancy, stratification).
Week 14	Ecological succession.
Week 15	Biogeography; the major distributions of plants & animals.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Identifying the laboratory ecology.
Week 2	Lab 2: The Science of meteorological -1.
Week 3	Lab 3: The Science of meteorological -2
Week 4	Lab 4: Treatment of physical properties in the water.
Week 5	Lab 5: Treatment the concentration of oxygen in the water.
Week 6	Lab 6: Treatment of alkaline water.
Week 7	Lab 7: Treatment of acidic water.
Week 8	Lab 8: Determination of productivity in a manner dissolved oxygen.
Week 9	Lab9: Treatment the salinity of the water.
Week10	Lab 10:Treatment of calcium and magnesium hardness in water.
Week 11	Lab 11: Treatment of total brackish water.
Week 12	Lab 12: Relations between organisms.
Week 13	Lab 13: Structure of society1.
Week 14	Lab 14: Structure of society1.
Week 15	Lab 15: Structure of the community.

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**STANDER METHODS FOR EXAMINATION OF WATER AND WASTEWATER. BY RODGER B. , ANDRRRREW D. AND EUGENE W. (2017).** **ENVIRONMENT ANALYSIS . BY PRADYOT PATNAIK .(2010)**	Yes Yes
Recommended Texts		
Websites	https://www.esa.org/about/what-does-ecology-have-to-do-with-me/ https://education.nationalgeographic.org/resource/ecology/	

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

Module Information معلومات المادة الدراسية					
Module Title	**Cell Biology**			**Module Delivery**	
Module Type	**Core**			☒Theory ☒Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	**Bio2-35023**				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	3		**Semester of Delivery**	5	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. Hiba Khalid mahmood		**e-mail**	hebsbio59@uomosul.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Mowaffaq Khaleel		**e-mail**	mufsbio62@uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**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 Objectives أهداف المادة الدراسية	This study aims 1. Understand the basic concepts of cellular function. 2. The ability to carefully analyze the scientific evidence contained in what is understood about cellular processes. 3. Developing skills by understanding the mechanisms and hypotheses that regulate cell work.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. To enable students to understand the cell biology. 2. Help the student to understand the organelles. 3. Encourage the student to develop their study skills. 4. The students must understand the structures and the types of the cells. 5. The students must learn how the cell divides? 6. The students must know the ways of feeding and drinking of the cells.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> Introduction to cell biology. cell theory. Prokaryotic cells . eukaryotic cells. [*8* hrs] Cell membrane structure. Cell membrane function. Cell wall structure. Cell wall function. [*10* hrs] Organelles : mitochondria ,plastids .nucleus. Ribosomes , lysosome , centrosome.. golgy complex, ER. [*10* hrs] Cell cycle. Mitosis. Meiosis. [*8* hrs] Revision problem classes [3 hrs] <u>Part B – Practical labs</u> study the prokaryotic and eukaryotic cells. Measure the length of the cell . Study the cell wall. modification and functions of plasma membrane. Study the cytoplasmic organelles part 1. Study the cytoplasmic organelles part 2. [18 hrs] Study the cell division (mitosis). Study the cell division (meiosis) . Structures of chromosomes..number and types of chromosomes. karyotyping part 1, karyotyping part 2. DNA replication. Gene expression part 1. Gene expression part 2.[18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents . Various techniques were used such as. Data show , Microscope, Posters . Students do study the following fields: The differences between prokaryotic and eukaryotic cells. Cell membrane and wall. The organelles of the cell. Cell cycle and the cell division. Gene expression. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction to cell biology .
Week 2	cell theory.
Week 3	Prokaryotic cells
Week 4	eukaryotic cells
Week 5	Cell membrane structure
Week 6	Cell membrane function
Week 7	Cell wall structure
Week 8	Cell wall function
Week 9	Organelles : mitochondria ,plastids
Week 10	nucleus
Week 11	Ribosomes , lysosome , centrosome.
Week 12	golgy complex, ER
Week 13	Cell cycle
Week 14	mitosis
Week 15	meiosis

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: study the prokaryotic and eukaryotic cells.
Week 2	Lab 2: Measure the length of the cell
Week 3	Lab 3: Study the cell wall.
Week 4	Lab 4: modification and functions of plasma membrane.
Week 5	Lab 5: Study the cytoplasmic organelles part 1
Week 6	Lab 6: Study the cytoplasmic organelles part 2
Week 7	Lab 7: Study the cell division (mitosis)
Week 8	Lab 8: Study the cell division (meiosis)
Week 9	Lab9: Structures of chromosomes.

Week10	Lab 10: number and types of chromosomes.
Week 11	Lab 11: karyotyping part 1
Week 12	Lab 12: karyotyping part 2
Week 13	Lab 13: DNA replication
Week 14	Lab 14: Gene expression part 1
Week 15	Lab 15: Gene expression part 2

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Bickers World of the cell/ eighth edition/Hardin j. and *et.al* Human Genetics /seven edition /Ricki lewis	Yes Yes
Recommended Texts		
Websites	https://www.nature.com/scitable/topic/cell-biology-13906536/ https://www.youtube.com/watch?v=URUJD5NEXC8 https://www.sciencedirect.com/book/9780323341264/cell-biology	

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

Module Information معلومات المادة الدراسية					
Module Title	**Water Microbiology**			**Module Delivery**	
Module Type	**Core**			☒Theory ☐ Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	**Bio2-36025**				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	3		**Semester of Delivery**	6	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. Rayan Mazin		**e-mail**	rayanmazin@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Aws Ibrahim Sulaiman		**e-mail**	awssbio61@uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**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 Objectives أهداف المادة الدراسية	This study aims 1. Know the concepts of water microbiology. 2. Studying the economic and environmental importance of water microbes. 3. Knowing the effect of microorganisms on the environment and the interactive effect with higher organisms. 4. Studying the role of water organisms in the formation and erosion of soil and the cycle of carbon and nitrogen. 5. Discuss the vital relationships of water microbes.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Every student be able to isolation and identification microorganisms from several habitats. 2. Every student have a knowledge about the effect of microorganisms on public health. 3. Detect the water quality for sanitary using several practical techniques (MPN, MFT, Colilert system, etc.) 4. By studying the student, he was able to understand the scientific subject 5. Helping the student to master the conduct of scientific experiments and tests for the subject 6. Encouraging him to develop his scientific skills.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures I Introduction of water . Distribution of microorganisms1 in water. Bacteria in water. Virus in water, Algae in water. Parasite in water. [*10* hrs] Soil borne pathogens1 Minerals cycle 1 (Carbon(Minerals Cycle 2 (Nitrogen(. Bioremediation. [*8* hrs] Water Is the Largest Microbial Habitat Aquatic Viruses: Mortality at Sea Algae: the major microbial biomass in freshwater systems Water Borne Pathogens (Virus, Parasites and Fungi.[*10* hrs] Water Borne Pathogens (Bacteria(Water Quality and Public Health. Wastewater Treatment [8 hrs] Revision problem classes [3 hrs] Part B – Practical labs Introduction in practical water Microbiology. Contact slide assay . microbial population count in water & soil. Bacteria and Actinomycetes . Fungi. Isolation of antibiotic producer from water. measuring CO2 production. Algae enumeration. filament Fungi.. [18 hrs] Bacteriological examination of water, Coliform bacteria + E.coli.. Fecal Enterococcus. isolation the Shigella. isolation the Salmonella. isolation Vibrio cholera. isolation Pseudomonas . [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents .Students do study the following fields: Environmental microbiology : Water are the Largest Microbial Habitat properties of soil layers. Distribution of microorganisms . Bacteria in water. Virus in water .Algae in water. Parasite in water . water borne pathogens . Minerals cycles (Carbon, Nitrogen) .Aquatic Viruses: Mortality at S. Algae: the major microbial biomass in freshwater systems .Water Borne Pathogens .Virus .Bacteria . Parasites .Water Quality and Public Health .Collection of water samples for analysis .Wastewater Treatment. Bioremediation. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction of water and Soil
Week 2	properties of soil layers.
Week 3	Distribution of microorganisms1 in soil.
Week 4	Bacteria in soil. Virus in soil, Algae in soil. Parasite in soil.
Week 5	Soil borne pathogens1
Week 6	Minerals cycle 1 (Carbon)
Week 7	Minerals Cycle 2 (Nitrogen)
Week 8	Bioremediation
Week 9	Water Is the Largest Microbial Habitat
Week 10	Aquatic Viruses: Mortality at Sea
Week 11	Algae: the major microbial biomass in freshwater systems
Week 12	Water Borne Pathogens (Virus, Parasites and Fungi)
Week 13	Water Borne Pathogens (Bacteria)
Week 14	Water Quality and Public Health.
Week 15	Wastewater Treatment

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction in practical water &Soil Microbiology.
Week 2	Lab 2: Contact slide assay.
Week 3	Lab 3: microbial population count in water & soil.
Week 4	Lab 4: Bacteria and Actinomycetes
Week 5	Lab 5: Fungi.
Week 6	Lab 6: Isolation of antibiotic producer from soil .
Week 7	Lab 7: measuring CO2 production.
Week 8	Lab 8: Algae enumeration.
Week 9	Lab9: filament Fungi.
Week10	Lab 10: Bacteriological examination of water, Coliform bacteria + E.coli.

Week 11	Lab 11: Fecal Enterococcus.
Week 12	Lab 12: isolation the Shigella.
Week 13	Lab 13: isolation the Salmonella.
Week 14	Lab 14: isolation Vibrio cholera .
Week 15	Lab 15: isolation Pseudomonas .

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Procop, G. W., Church, D. L., Hall, G. S., & Janda, W. M. (2020). Koneman's color atlas and textbook of diagnostic microbiology. Jones & Bartlett Publishers.** **Tortora, G. J., Funke, B. R., & Case, C. L. (2015). Microbiology: an introduction. Pearson Higher Ed.** **Talaro, K., Chess, B., Wiersema, D. S., & Sen, P. (2013). *Foundations in Microbiology, 2012*. McGraw-Hill.** **Madigan, M. T., Clark, D. P., Stahl, D., & Martinko, J. M. (2010). Brock biology of microorganisms 13th edition. Benjamin Cummings.**	Yes Yes
Recommended Texts	**Microbiology : A laboratory Manual 12 th edition . Pearson .2th edition.** **General Microbiology lab Manual . memoir . 2018.**	Yes
Websites	https://uomustansiriyah.edu.iq/media/lectures/6/6_2022_01_14!03_48_06_PM.pdf https://www.uomustansiriyah.edu.iq/media/lectures/6/6_2022_10_17!04_41_57_AM.pdf	

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

Module Information معلومات المادة الدراسية					
Module Title	**Bacterial Physiology**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Bio2-36026**				
ECTS Credits	5				
SWL (hr/sem)	**125**				
Module Level		3	**Semester of Delivery**		6
Administering Department		Bio	**College**	Sci	
Module Leader	Dr Essra Ghanim Hazim Alsammak		**e-mail**	esrsbio19@uomosul.edu.iq	
Module Leader's Acad. Title		Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	Dr Enas Abdul Munieem Al-Layla		**e-mail**	**inasamuneem@uomosul.edu.iq**	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		1/10/2024	**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 Objectives أهداف المادة الدراسية	This study aims 1. Convey information to the student about the latest information on bacterial physiology. 2. The importance of the factors affecting its growth. 3 . Microstructure of a microbial c
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**1.the student know the bacterial structure .** **2.the function of each structure .** **3. how culture and study the feature of bacteria.** **4.The Students understood what is microbial growth curve** **5. The students were perfect in Detection of bacterial enzyme** **6. Try to improve their skills in Antimicrobial sensitivity test.**
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Define bacteria physiology and bacterial structure (The shape and size of bacteria. (Cell wall structure and function of gram positive and gram negative bacteria & Atypical cell wall include Archaea. . [*10* hrs] The structure out of the cell wall (Glycocalyx , s-layer, Pili and Fimbriae, flagella) chemotaxis. Cytoplasmic membrane function & structure for bacteria and Archaea. Cytoplasmic structure ,Nuclear area, inclusion bodes . Plasmid , ribosomes ,Spores structure. [*8* hrs] Nutrition macro& micronutrients, growth factor. Uptake of Nutrients by The Cell. Reproduction of bacterial cells. Protein Secretion system. Cellular Energy, Free Energy. Enzymes.[*10* hrs] .Respiratory Metabolism (Autotrophic & Heterotrophic Metabolism(. Glycolytic Pathways. Archaebacterial Glycolytic Pathways. Lipid Catabolism, Protein Catabolism. Tri carboxylic acid cycle (TCA Cycle). Oxidative Phosphorylation Fermentation. Oxygenic & An oxygenic Photosynthesis [8 hrs] Revision problem classes [3 hrs] Part B – Practical labs Introductin,Microbial growth curve and Mathmatics. Microbial growth factorsDetection of bacterial enzyme1. Detection of bacterial enzyme2. Detection of bacterial enzyme3. Detection of bacterial enzyme4. [18 hrs] Bacterial toxins1. Bacterial toxins2. Oxidation Reduction Reactions. Detection of fermentation metabolisims1. Detection of fermentation metabolisims2. Antimicrobial sensitivity tests 1. Antimicrobial sensitivity tests 2. API. VITEK. [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents . Various techniques were used such as. Data show , Microscope, Posters . Students do study the following fields: Bacterial structure . Function of each structure .Types of nutrition. Source of energy. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري

	Material Covered
Week 1	Define bacteria physiology and bacterial structure (The shape and size of bacteria) .
Week 2	Cell wall structure and function of gram positive and gram negative bacteria & Atypical cell wall include Archaea.
Week 3	The structure out of the cell wall (Glycocalyx , s-layer, Pili and Fimbriae, flagella) chemotaxis .
Week 4	Cytoplasmic membrane function & structure for bacteria and Archaea .
Week 5	Cytoplasmic structure ,Nuclear area, inclusion bodes . Plasmid , ribosomes ,Spores structure .
Week 6	Nutrition macro& micronutrients, growth factor. Uptake of Nutrients by The Cell.
Week 7	Reproduction of bacterial cells.
Week 8	Protein Secretion system.
Week 9	Cellular Energy, Free Energy.Enzymes .
Week 10	Respiratory Metabolism (Autotrophic & Heterotrophic Metabolism.)
Week 11	Glycolytic Pathways.
Week 12	Archaebacterial Glycolytic Pathways. Lipid Catabolism, Protein Catabolism.
Week 13	Tri carboxylic acid cycle (TCA Cycle). Oxidative Phosphorylation
Week 14	Fermentation.
Week 15	Oxygenic & An oxygenic Photosynthesis

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introductin,Microbial growth curve and Mathmatics .
Week 2	Lab 2: Microbial growth factors
Week 3	Lab 3: Detection of bacterial enzyme1
Week 4	Lab 4: Detection of bacterial enzyme2
Week 5	Lab 5: Detection of bacterial enzyme3
Week 6	Lab 6: Detection of bacterial enzyme4
Week 7	Lab 7: Bacterial toxins1
Week 8	Lab 8: Bacterial toxins2

Week 9	Lab9: Oxidation Reduction Reactions
Week10	Lab 10: Detection of fermentation metabolisims1
Week 11	Lab 11: Detection of fermentation metabolisims2
Week 12	Lab 12: Antimicrobial sensitivity tests 1
Week 13	Lab 13: Antimicrobial sensitivity tests 2
Week 14	Lab 14: API
Week 15	Lab 15: VITEK

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Riedel ,S., Morse, S.A., Mietzner, T., Miller ,S. (2019). Jawetz,Melnick & Adelberg s Medical Microbiology.28th ed. McGraw-Hill Companies, U.S.A.** **Gerard J. Tortora , Berdell R. Funke ,Christine L. Case .(2013) Microbiology An Introduction, 11ed .** **Willey ,J.M .; Sherwood,L.M.; Woolverton, C.J (2017). Prescott s Microbiology. 10th ed., McGraw-Hill Companies, U.S.A.** **Winn, W. C.; Allen.; S. D. J.; Janda, W. U.; Koneman, E. W.; Procop, G. W.; Schreckenbenberger, P. C. and Woods, G. L. (2006). " Koneman's Color Atlas and Text Book of Diagnostic Microbiology". 6th ed., Lippincott Williams and Wilkins, U.S.A.**	Yes Yes
Recommended Texts	**Benson's Microbiological Applications: Laboratory Manual in General Microbiology.** **Laboratory Manual of experimental by Ronald**	Yes
Websites	https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/microbial-physiology https://www.wur.nl/en/research-results/chair-groups/agrotechnology-and-food-sciences/biomolecular-sciences/laboratory-of-microbiology/research/microbial-physiology.htm	

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

Module Information معلومات المادة الدراسية					
Module Title	**Animal Physiology**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Bio2-36027**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	3		**Semester of Delivery**	6	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. Muntaha Mahmood		**e-mail**	muntsbio17@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Abeer Attaala Aeed		**e-mail**	**abesbio53@uomosul.edu.iq**	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**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 Objectives أهداف المادة الدراسية	This study aims 1. The student's comprehension of the concept of the course and his ability to distinguish between it and other sciences. 2. Addressing a comprehensive description of the various body systems, with a focus on ruminant field animals and poultry. 3. Studying the vital processes that occur in the animal's body that transform the nutrients that the animal eats and turn them into animal products or other secondary waste. 4. Basic and physiology of growth and reproduction. 5. Keep up with the development that is happening in the world
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. The students understand different physiological mechanisms in the body. 2. Help the students to master the interaction and relationships between body systems. 3. The development of student's skills for going into relationship between the physiological and pathological disorders. 4. The students understand mode of action each physiological test. 5. Help the students to master the procedure of each physiological test. 6. The development of student's skills for going into the laboratory work experience as specialist who has an excellent background on all physiological tests and their relationship to disease and not as technician operating advice.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Introduction to Physiology. Cell physiology. The mechanisms of transports across the cell membrane. Phagocytosis mechanism. Pinocytosis mechanism. [*10* hrs] Blood physiology. Physical Characteristics of blood. Plasma, Erythrocytes, Erythropoiesis. erythrocyte disorders. Types of anemia. Leukocytes. Functions of all types of Leukocytes. Platelets, Hemostasis mechanism, Fibrinolysis.[*18*hrs] Physiology of Digestion system. Functions of the Digestive System. Nervous Regulation of the Digestive System. Function of Stomach. Regulation of Gastric Secretion. Pancreas. Gall Bladder. Small Intestine. Large intestine [18hrs] Revision problem classes [3 hrs] Part B – Practical labs General safety instructions in the laboratory. Introduction Circulatory system. Fragility test 1. Fragility test 2. Total Red Blood Cell count. differential count. Estimation Hemoglobin. [18 hrs] PCV test. Platelets count. : ESR test. Bleeding time Test. Blood pressure. Physiological and pathological variation of Blood pressure. Blood groups. Respiratory test.[18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents . Various techniques were used such as. Data show , Microscope, Posters . Students do study the following fields: An introduction to the study of Physiology of the body. Definition of body systems and understands how this system work under normal conditions. Definition of the techniques uses to estimation of body parameters. Study the disorders of this systems physiology and study the diseases results from disorders in homeostats. The relationships between the different body systems. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction to Physiology.
Week 2	Cell physiology.
Week 3	The mechanisms of transports across the cell membrane.
Week 4	Phagocytosis mechanism. Pinocytosis mechanism.
Week 5	Blood physiology.
Week 6	Physical Characteristics of blood. Plasma, Erythrocytes, Erythropoiesis.
Week 7	erythrocyte disorders.
Week 8	Types of anemia. Leukocytes.
Week 9	Functions of all types of Leukocytes.
Week 10	Platelets, Hemostasis mechanism, Fibrinolysis.
Week 11	Physiology of Digestion system.
Week 12	Functions of the Digestive System.
Week 13	Nervous Regulation of the Digestive System. Function of Stomach. Regulation of Gastric Secretion.
Week 14	Pancreas. Gall Bladder.
Week 15	Small Intestine. Large intestine.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: General safety instructions in the laboratory.
Week 2	Lab 2: Introduction Circulatory system.
Week 3	Lab 3: Fragility test 1.
Week 4	Lab 4: Fragility test 2.
Week 5	Lab 5: Total Red Blood Cell count.
Week 6	Lab 6: differential count.
Week 7	Lab 7: Estimation Hemoglobin.
Week 8	Lab 8: PCV test.
Week 9	Lab9: Platelets count.
Week10	Lab 10: ESR test.
Week 11	Lab 11: Bleeding time Test.
Week 12	Lab 12: Blood pressure.
Week 13	Lab 13: Physiological and pathological variation of Blood pressure.
Week 14	Lab 14: Blood groups.
Week 15	Lab 15: Respiratory test.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Guyton, A. and Hall, J.E. (2016). "Text book of physiology". 11th ed. Elsevier Saunders. China.** **Barrett, K.; brooks, H.; Boitano, S. and Barman, S. (2010). "Ganong's eview of Medical Physiology". 23 th edition. McGraw Hill Companies. New York**	Yes Yes
Recommended Texts	**Ghia, CL. (2013). A Textbook of Practical Physiology. Jaypee Brothers Medical Publishers (P) Ltd.; 8th edition.**	No
Websites	https://www.nature.com/subjects/animal-physiology https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/animal-physiology	

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

Module Information معلومات المادة الدراسية					
Module Title	**Pollution**			**Module Delivery**	
Module Type	**Core**			☒Theory ☒ Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	**Bio2-36128**				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	3		**Semester of Delivery**	6	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. Abdulmoneim Mohammed Ali Kannah		**e-mail**	abmsbio38@gmail.com	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Mahmood Esmaeel Enas Qusay		**e-mail**	Mahmoodaljubory76@gmail.com	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Ecology	**Semester**	5
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	This study aims 1. The student's knowledge of the concept of pollution, its causes, types, risks, and how to reduce pollution. 2. Knowing the negative effects of pollutants on the environment and human health. 3. Identify the harmful effects of pesticides, fertilizers, oil and others. 4. Identify solid waste, its types, damages, and disposal methods. 5. Identify the types of radiation and radioactive pollution, its sources and its biological damage. 6. Learn about the concept of the ecosystem and its components. 7. Introducing the concept of environmental pollution and the factors contributing to it. 8. Clarify the dangers and consequences of environmental pollution.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. How to deal with any environmental problem and control the problem within the limits of capabilities. 2. Understanding and distinguishing the types of factors and substances that contribute to the pollution of the ecosystem. 3.Every student be able to knowledge about environment and how pollution it. 4. Every student be able to chemical analysis water. 5. The student should be able to collect and summarize useful information related to a study. 6. The student proposes solutions to some environmental problems within the framework of protecting and preserving them. 7 . That the student has the ability to work in a team.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> General introduction; definition. pollution types .Point sources & non-point sources of pollution . Water pollution . Major pollutant. [*16* hrs] Major pollutant: The hydrocarbons Agricultural pollution. The solid waste. Thermal pollution. Air pollution .[*10* hrs] The greenhouse phenomenon. Acid rains. Thermal inversion. Noise pollution. Radiation pollution. Personal pollution. Visual Pollution. [12 hrs] Revision problem classes [3 hrs] <u>Part B – Practical labs</u> Identifying the laboratory pollution.The Science of meteorological. Determination residual chlorine in the water. Determination chloride in the water. Determination

	BOD5 in the water. Determination COD. In the water. Determination nitrate in the water. [18 hrs] Determination phosphate in the water. Determination Sulphate in the water. Determination silica in the water. Relations between organisms. Field capacity of soil . Soil color. Soil Texture. Determination heavy metal in the water,1. Determination heavy metal in the water,2.. [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents Students do study the following fields: Introduction of pollution. Types of pollution. The pollutants. Water Pollution. Soil Pollution. Noise Pollution. Introduction of Lab pollution. Identify the types of water pollutants. Able to physical and chemical analysis for water. Most students were active in our classes and interactive between them and us also. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	General introduction; definition. pollution types.
Week 2	Point sources & non-point sources of pollution
Week 3	Water pollution.
Week 4	Major pollutant. Major pollutant:The hydrocarbons
Week 5	Agricultural pollution.
Week 6	The solid waste.
Week 7	Thermal pollution.
Week 8	Air pollution
Week 9	The greenhouse phenomenon.
Week 10	Acid rains.
Week 11	Thermal inversion.
Week 12	Noise pollution.
Week 13	Radiation pollution.
Week 14	Personal pollution.
Week 15	Visual Pollution.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Identifying the laboratory pollution.
Week 2	Lab 2: The Science of meteorological.
Week 3	Lab 3: Determination residual chlorine in the water.
Week 4	Lab 4: Determination chloride in the water.
Week 5	Lab 5: Determination BOD_5 in the water.
Week 6	Lab 6: Determination COD. In the water.
Week 7	Lab 7: Determination nitrate in the water.
Week 8	Lab 8: Determination phosphate in the water.

Week 9	Lab9: Determination Sulphate in the water.
Week10	Lab 10: Determination silica in the water.
Week 11	Lab 11: Relations between organisms.
Week 12	Lab 12: Field capacity of soil.
Week 13	Lab 13: Soil color. Soil Texture.
Week 14	Lab 14: Determination heavy metal in the water,1.
Week 15	Lab 15: Determination heavy metal in the water,2.

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**STANDER METHODS FOR EXAMINATION OF WATER AND WASTEWATER. BY RODGER B. , ANDRRRREW D. AND EUGENE W. (2017).** **ENVIRONMENT ANALYSIS . BY PRADYOT PATNAIK .(2010)**	Yes Yes
Recommended Texts	**Understanding Environmental Pollution. (2020).** Marquita K. Hill.	No
Websites	https://www.britannica.com/science/pollution-environment https://www.eea.europa.eu/en/topics/in-depth/pollution	

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

Module Information معلومات المادة الدراسية					
Module Title	**Genetics**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Bio2-36129**				
ECTS Credits	3				
SWL (hr/sem)	**75**				
Module Level	3		**Semester of Delivery**	6	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. Hiba Khalid mahmood		**e-mail**	hebsbio59@uomosul.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Mowaffaq Khaleel		**e-mail**	mufsbio62@uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Cell Biology	**Semester**	5
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	This study aims 1. Introduce the student to the science of genetics, its branches, and its importance. 2. Introducing the student to the science of genetics, its branches, and its importance. 3. Introduce the student to the cytological structure of the plant cell, with a focus on the cell nucleus, its genetic components and functions. 4. Knowledge of Mendel laws and their applications. 5. The student is familiar with the identification of genetic factors and the extent of their influence genetically. 6. Giving the student the necessary experience and skills in the field of basics of genetics in general.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. To enable students to understand the genetics 2. Help the student to understand the law of genetics 3. Encourage the student to develop their study skills. 4. The students must know the traits of pea plant studied by Mendel. 5. The students must understand the solution method of genetic problem. 6. The students must learn the genetic disease.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> Introduction in Genetics. Basic Genetics , Genetic Terminology. The Physical Basis of Heredity. Effects of the Environment on genetics.[*10* hrs] Mendel's Studies. allelic relationship. Determination of Sex. sex- linked inheritance. [*8* hrs] Cytogenetic : Changes I Structure of Chromosomes. Changes in Chromosomes Number. [*10* hrs] Gene mutation. Genes in Individuals. Linkage. Crossing Over. Mapping of Chromosomes. [8 hrs] Revision problem classes [3 hrs] <u>Part B – Practical labs</u> The characters of the best organism for the genetic studies. The traits of pea plant. Mendels first law and solution of genetic problems. Mendels second law and solution of genetic problems. Punnet squares and solution of genetic problems. Part 1 Punnet squares and solution of genetic problems. part 2 . Mendel's characters in human, solution of genetic problems. the characters link with sex, solution of genetic problems. [18 hrs] Pedigree analysis, solution of genetic problems. Forked line method. solution of genetic problems. Diagnosis of genetic disease. solution of genetic problems. The corn plant Drosophila. [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents . Various techniques were used such as. Data show , Microscope, Posters,. Students do study the following fields: Genetic traits inherit from parents. Mendel's laws. The genetic diseases. Pedigree analysis. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction in Genetics
Week 2	Basic Genetics , Genetic Terminology
Week 3	The Physical Basis of Heredity.
Week 4	Effects of the Environment on genetics.
Week 5	Mendel's Studies.
Week 6	allelic relationship.
Week 7	Determination of Sex.
Week 8	sex- linked inheritance
Week 9	Cytogenetic : Changes in Structure of Chromosomes.
Week 10	Changes in Chromosomes Number.
Week 11	Gene mutation.
Week 12	Genes in Individuals
Week 13	Linkage
Week 14	Crossing Over.
Week 15	Mapping of Chromosomes.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: The characters of the best organism for the genetic studies .
Week 2	Lab 2: The traits of pea plant.
Week 3	Lab 3: Mendels first law and solution of genetic problems.
Week 4	Lab 4: Mendels second law and solution of genetic problems.
Week 5	Lab 5: Punnet squares and solution of genetic problems. Part 1
Week 6	Lab 6: Punnet squares and solution of genetic problems. part 2
Week 7	Lab 7: Mendel's characters in human, solution of genetic problems.
Week 8	Lab 8:. the characters link with sex, solution of genetic problems.
Week 9	Lab9: Pedigree analysis, solution of genetic problems.

Week10	Lab 10: Forked line method.
Week 11	Lab 11: solution of genetic problems.
Week 12	Lab 12: Diagnosis of genetic disease.
Week 13	Lab 13: solution of genetic problems.
Week 14	Lab 14: The corn plant
Week 15	Lab 15: Drosophila

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Human Genetics /seven edition /Ricki Lewis** **Beckers World of the cell / eighth edition/ Hardin j. and *et.al.***	Yes Yes
Recommended Texts	Human Genetics and Genomics Bruce R. Korf, 2007	No
Websites	https://nigms.nih.gov/education/fact-sheets/Pages/genetics.aspx https://kidshealth.org/en/parents/about-genetics.html	

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

Module Information معلومات المادة الدراسية					
Module Title	**Soil Microbiology**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Bio2-35019**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	3		**Semester of Delivery**	5	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. Rayan Mazin		**e-mail**	rayanmazin@uomosul.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Aws Ibrahim Sulaiman		**e-mail**	awssbio61@uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**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 Objectives أهداف المادة الدراسية	This study aims 1. Know the concepts of soil microbiology. 2. Studying the economic and environmental importance of soil microbes. 3. Knowing the effect of microorganisms on the environment and the interactive effect with higher organisms. 4. Studying the role of soil organisms in the formation and erosion of soil and the cycle of carbon and nitrogen. 5. Discuss the vital relationships of water and soil microbes.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Every student be able to isolation and identification microorganisms from several habitats. 2. Every student have a knowledge about the effect of microorganisms on public health. 4. By studying the student, he was able to understand the scientific subject 5. Helping the student to master the conduct of scientific experiments and tests for the subject 6. Encouraging him to develop his scientific skills.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> I Introduction of Soil . properties of soil layers. Distribution of microorganisms1 in soil. Bacteria in soil. Virus in soil, Algae in soil. Parasite in soil. [*10* hrs] Soil borne pathogens1 Minerals cycle 1 (Carbon(Minerals Cycle 2 (Nitrogen(. Bioremediation. [*8* hrs] soil Is the Largest Microbial Habitat Aquatic Viruses: Mortality at Sea Algae: the major microbial biomass in freshwater systems Water Borne Pathogens (Virus, Parasites and Fungi.[*10* hrs] soil Borne Pathogens (Bacteria(Water Quality and Public Health. Wastewater Treatment [8 hrs] Revision problem classes [3 hrs] <u>Part B – Practical labs</u> Introduction in practical Soil Microbiology. Contact slide assay . microbial population count in soil. Bacteria and Actinomycetes . Fungi. Isolation of antibiotic producer from soil. measuring CO2 production. Algae enumeration. filament Fungi.. [18 hrs] Bacteriological examination, Coliform bacteria + E.coli.. Fecal Enterococcus. isolation the Shigella. isolation the Salmonella. isolation Vibrio cholera. isolation Pseudomonas . [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents .Students do

	study the following fields: Environmental microbiology : Soil is the Largest Microbial Habitat properties of soil layers. Distribution of microorganisms . Bacteria in soil. Virus in soil .Algae in soil. Parasite in soil . Soil borne pathogens . Minerals cycles (Carbon, Nitrogen) .Aquatic Viruses: Mortality at S. Algae: the major microbial biomass in freshwater systems .soil Borne Pathogens .Virus .Bacteria . Parasites . Water Quality and Public Health .Collection of soil samples for analysis.. Bioremediation. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction of water and Soil
Week 2	properties of soil layers.
Week 3	Distribution of microorganisms1 in soil.
Week 4	Bacteria in soil. Virus in soil, Algae in soil. Parasite in soil.
Week 5	Soil borne pathogens1
Week 6	Minerals cycle 1 (Carbon)
Week 7	Minerals Cycle 2 (Nitrogen)
Week 8	Bioremediation
Week 9	Water Is the Largest Microbial Habitat
Week 10	Aquatic Viruses: Mortality at Sea
Week 11	Algae: the major microbial biomass in freshwater systems
Week 12	Water Borne Pathogens (Virus, Parasites and Fungi)
Week 13	Water Borne Pathogens (Bacteria)
Week 14	Water Quality and Public Health.
Week 15	Wastewater Treatment

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction in practical water &Soil Microbiology.
Week 2	Lab 2: Contact slide assay.
Week 3	Lab 3: microbial population count in water & soil.
Week 4	Lab 4: Bacteria and Actinomycetes
Week 5	Lab 5: Fungi.
Week 6	Lab 6: Isolation of antibiotic producer from soil .
Week 7	Lab 7: measuring CO2 production.
Week 8	Lab 8: Algae enumeration.
Week 9	Lab9: filament Fungi.
Week10	Lab 10: Bacteriological examination of water, Coliform bacteria + E.coli.

Week 11	Lab 11: Fecal Enterococcus.
Week 12	Lab 12: isolation the Shigella.
Week 13	Lab 13: isolation the Salmonella.
Week 14	Lab 14: isolation Vibrio cholera .
Week 15	Lab 15: isolation Pseudomonas .

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Procop, G. W., Church, D. L., Hall, G. S., & Janda, W. M. (2020). Koneman's color atlas and textbook of diagnostic microbiology. Jones & Bartlett Publishers.** **Tortora, G. J., Funke, B. R., & Case, C. L. (2015). Microbiology: an introduction. Pearson Higher Ed.** **Talaro, K., Chess, B., Wiersema, D. S., & Sen, P. (2013). *Foundations in Microbiology, 2012*. McGraw-Hill.** **Madigan, M. T., Clark, D. P., Stahl, D., & Martinko, J. M. (2010). Brock biology of microorganisms 13th edition. Benjamin Cummings.**	Yes Yes
Recommended Texts	**Microbiology : A laboratory Manual 12 th edition . Pearson .2th edition.** **General Microbiology lab Manual . memoir . 2018.**	Yes
Websites	https://uomustansiriyah.edu.iq/media/lectures/6/6_2022_01_14!03_48_06_PM.pdf https://www.uomustansiriyah.edu.iq/media/lectures/6/6_2022_10_17!04_41_57_AM.pdf	

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

Module Information معلومات المادة الدراسية					
Module Title	**Histology**			**Module Delivery**	
Module Type	**Core**			☒Theory ☒ Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	**Bio2-35021**				
ECTS Credits	5				
SWL (hr/sem)	**125**				
Module Level		3	**Semester of Delivery**		5
Administering Department		Bio	**College**	Sci	
Module Leader	Dr. Fatima Qasim Mohammed		**e-mail**	fatsbio25@uomosul.edu.iq	
Module Leader's Acad. Title		Assistant Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	Dr. Ilham Abd Allah Ali Al-saleem		**e-mail**	elham_alsaleem@yahoo.com	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		2024ظ10ظ1	**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 Objectives أهداف المادة الدراسية	This study aims 1 . Clarify the terms related to tissues for students. 2 . Explain the main types of tissues. 3 . Study its composition. 4 . Study their functions. 5 . distinguish them from each other. 6 . Identify the location of each tissue in the different organs of the body. Keeping pace with the development in the world of histology.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1.The students could recognize the different tissue of each type 2. The students They were able to diagnose all layers of the same tissue and identify the types of cells in them 3. They could distinguish any slide of the basic tissue
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Introduction in Histology , The cell . Epithelial Tissue .The types of epithelial tissue The simple epithelial tissue. Modification in surfaces of epithelial tissues Glandular epithelial tissue. Connective Tissue Matrix of C.T and repair it.[*14* hrs] The types of connective tissue. Dense connective tissue. Cartilage. The bone (bone cells,The bone types and matrix). The bone histogenesis and repair it. Joints . The blood and its components Blood and Lymph forming organs Non-granular leukocytes, Blood Platlets. Haemopoiesis , Bone marrow.. [*10* hrs] Muscular tissues, actin, myosin ,Myofilaments. Sarcoplasmic reticulum، Myoneural junction. Cardiac muscles,Smooth muscles . Nervous tissues,neurons. Peripheral nerves. Types of nerve fibers، Neuroglia, Ganglia. [*14* hrs] Revision problem classes [3 hrs] Part B – Practical labs The simple epithelial tissue part 1. The simple epithelial tissue part 2. Stratified epithelial tissue part 1. Stratified epithelial tissue part 2. Connective tissue(Cells, Fibers). Connective tissue (Loose C. T.). Dense connective tissue. Blood. [18 hrs] Cartilage. Bone. Muscular tissue. Nerve system: the type of nerve cells. Peripheral nerve, motor end plate. nerve fiber ,spinal. Sympathetic ganglia.Cerebellum.. [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم

Strategies	Expanding students' perceptions about this science and its contents . Various techniques were used such as. Data show , Microscope, Posters . Students do study the following fields: The epithelial tissue . The connective tissue. Special connective tissue. Nerve and vascular system. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Introduction in Histology , The cell.

Week 2	Epithelial Tissue .The types of epithelial tissue The simple epithelial tissue. Modification in surfaces of epithelial tissues
Week 3	Glandular epithelial tissue. Connective Tissue Matrix of C.T and repair it.
Week 4	The types of connective tissue.
Week 5	Dense connective tissue .
Week 6	Cartilage. The bone (bone cells,The bone types and matrix)
Week 7	The bone histogenesis and repair it. Joints.
Week 8	The blood and its components Blood and Lymph forming organs
Week 9	Non-granular leukocytes, Blood Platlets.
Week 10	Haemopoiesis , Bone marrow.
Week 11	Muscular tissues,actin, myosin Myofilaments .
Week 12	Sarcoplasmic reticulum, Myoneural junction.
Week 13	Cardiac muscles,Smooth muscles.
Week 14	Nervous tissues,neurons. Peripheral nerves.
Week 15	Types of nerve fibers, Neuroglia,Ganglia.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: The simple epithelial tissue part 1.
Week 2	Lab 2: The simple epithelial tissue part 2.
Week 3	Lab 3: Stratified epithelial tissue part 1.
Week 4	Lab 4: Stratified epithelial tissue part 2.
Week 5	Lab 5: Connective tissue(Cells, Fibers).
Week 6	Lab 6: Connective tissue (Loose C. T.).
Week 7	Lab 7: Dense connective tissue .
Week 8	Lab 8: Blood.
Week 9	Lab9: Cartilage .
Week10	Lab 10: Bone.
Week 11	Lab 11: Muscular tissue .

Week 12	Lab 12: Nerve system: the type of nerve cells.
Week 13	Lab 13: Peripheral nerve, motor end plate .
Week 14	Lab 14: nerve fiber ,spinal.
Week 15	Lab 15: Sympathetic ganglia.Cerebellum.

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Schmidt, I. G. (2003).ATLAS OF HUMAN HISTOLOGY,FOURTH EDITION** **KRAUSE'S ESSENTIAL HUMAN HISTOLOGY FOR MEDICAL STUDENTS**	Yes Yes
Recommended Texts	**School of anatomy and Human Biology-The University of Western Australia.**	Yes
Websites	https://www.histologyguide.com/about-us/sorenson-atlas-of-human-histology-chapters-1-and-14.pdf https://www2.nsysu.edu.tw/Bio/images/commen/hist98.pdf	

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

Module Information معلومات المادة الدراسية					
Module Title	**Ecology**		**Module Delivery**		
Module Type	**Core**		☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**		
Module Code	**Bio2-35022**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	3		**Semester of Delivery**	5	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. Abdulmoneim Mohammed Ali Kannah		**e-mail**	abmsbio38@gmail.com	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Mahmood Esmaeel Enas Qusay		**e-mail**	Mahmoodaljubory76@gmail.com	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**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 Objectives أهداف المادة الدراسية	This study aims 1. Provide the student with aspects of knowledge of the concepts, types and characteristics of environmental systems. 2. Providing the student with knowledge that enables him to identify the importance of environmental systems and the problems they face. 3. Enable the student to choose environmental models and use them in the study of environmental systems . 4. Providing students with positive attitudes towards preserving and protecting environmental systems . 5. Provide students with positive attitudes towards preserving and protecting environmental systems . 6. Enable the student to choose environmental models and use them in the study of environmental systems. 7. Providing students with aspects of knowledge of the concepts, types and characteristics of environmental systems. 8. The student acquires practical and applied skills based on theoretical lessons.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**1.Every student be able to knowledge about environment and how pollution it.** **2. Every student be able to chemical analysis water.** **3. The student should be able to collect and summarize useful information related to a study.** **4. The student proposes solutions to some environmental problems within the framework of protecting and preserving them.** **5 . That the student has the ability to work in a team.**
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> Introduction; Definition; Scope; Divisions. The Ecosystems (definition, characters, volume, structure). Food chains & food webs. Ecological pyramids & Energy flow; Ecological efficiency. The biogeochemical cycles. Incomplete ecosystems . [*10* hrs] Liebig law of minimum; Shelford law of tolerance. The abiotic factors:1-The Soil . 2-The water .The components of natural water (anions, cations, salts). 2-The water .The components of natural water (gases & organic matters(. Characters of the population.[*10* hrs] The biological interactions. The communities (principals of bio-communities, Concept,. classification, dominancy, stratification.(Ecological succession. Biogeography; the major distributions of plants & animals**.** [8 hrs] Revision problem classes [3 hrs] <u>Part B – Practical labs</u>

	Identifying the laboratory ecology. The Science of meteorological -1.The Science of meteorological -2. Treatment of physical properties in the water. Treatment the concentration of oxygen in the water. Treatment of alkaline water. Treatment of acidic water.[18 hrs] **Determination of productivity in a manner dissolved oxygen. Treatment the salinity of the water. Treatment of calcium and magnesium hardness in water. Treatment of total brackish water. Relations between organisms. Structure of society1. Structure of society1. Structure of the community.** [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents . Various techniques were used such as. Data show , Microscope, Posters . Student were active in our classes and interactive between them and us also. Teaching Techniques were Variety. Students do study the following fields: Introduction of ecology. Divisions of ecology. Ecosystems . Nutritional Relationships. Food Chains & Food Webs. Ecological pyramid. Environmental Productivity. Introduction of Lab. ecology .Safety in the laboratory. Identify biotic and abiotic environmental factors. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction; Definition; Scope; Divisions.
Week 2	The Ecosystems (definition, characters, volume, structure).
Week 3	Food chains & food webs.
Week 4	Ecological pyramids & Energy flow; Ecological efficiency.
Week 5	The biogeochemical cycles.
Week 6	Incomplete ecosystems
Week 7	Liebig law of minimum; Shelford law of tolerance.
Week 8	The abiotic factors:1-The Soil.
Week 9	2-The water The components of natural water (anions, cations, salts,)
Week 10	2-The water The components of natural water (gases & organic matters)
Week 11	Characters of the population.
Week 12	The biological interactions
Week 13	The communities (principals of bio-communities, Concept, classification, dominancy, stratification).
Week 14	Ecological succession.
Week 15	Biogeography; the major distributions of plants & animals.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Identifying the laboratory ecology.
Week 2	Lab 2: The Science of meteorological -1.
Week 3	Lab 3: The Science of meteorological -2
Week 4	Lab 4: Treatment of physical properties in the water.
Week 5	Lab 5: Treatment the concentration of oxygen in the water.
Week 6	Lab 6: Treatment of alkaline water.
Week 7	Lab 7: Treatment of acidic water.
Week 8	Lab 8: Determination of productivity in a manner dissolved oxygen.
Week 9	Lab9: Treatment the salinity of the water.
Week10	Lab 10:Treatment of calcium and magnesium hardness in water.
Week 11	Lab 11: Treatment of total brackish water.
Week 12	Lab 12: Relations between organisms.
Week 13	Lab 13: Structure of society1.
Week 14	Lab 14: Structure of society1.
Week 15	Lab 15: Structure of the community.

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**STANDER METHODS FOR EXAMINATION OF WATER AND WASTEWATER. BY RODGER B. , ANDRRRREW D. AND EUGENE W. (2017).** **ENVIRONMENT ANALYSIS . BY PRADYOT PATNAIK .(2010)**	Yes Yes
Recommended Texts		
Websites	https://www.esa.org/about/what-does-ecology-have-to-do-with-me/ https://education.nationalgeographic.org/resource/ecology/	

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

Module Information معلومات المادة الدراسية					
Module Title	**Cell Biology**			**Module Delivery**	
Module Type	**Core**			☒Theory ☒Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	**Bio2-35023**				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	3		**Semester of Delivery**	5	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. Hiba Khalid mahmood		**e-mail**	hebsbio59@uomosul.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Mowaffaq Khaleel		**e-mail**	mufsbio62@uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**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 Objectives أهداف المادة الدراسية	This study aims 1. Understand the basic concepts of cellular function. 2. The ability to carefully analyze the scientific evidence contained in what is understood about cellular processes. 3. Developing skills by understanding the mechanisms and hypotheses that regulate cell work.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. To enable students to understand the cell biology. 2. Help the student to understand the organelles. 3. Encourage the student to develop their study skills. 4. The students must understand the structures and the types of the cells. 5. The students must learn how the cell divides? 6. The students must know the ways of feeding and drinking of the cells.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> Introduction to cell biology. cell theory. Prokaryotic cells . eukaryotic cells. [*8* hrs] Cell membrane structure. Cell membrane function. Cell wall structure. Cell wall function. [*10* hrs] Organelles : mitochondria ,plastids .nucleus. Ribosomes , lysosome , centrosome.. golgy complex, ER. [*10* hrs] Cell cycle. Mitosis. Meiosis. [*8* hrs] Revision problem classes [3 hrs] <u>Part B – Practical labs</u> study the prokaryotic and eukaryotic cells. Measure the length of the cell . Study the cell wall. modification and functions of plasma membrane. Study the cytoplasmic organelles part 1. Study the cytoplasmic organelles part 2. [18 hrs] Study the cell division (mitosis). Study the cell division (meiosis) . Structures of chromosomes..number and types of chromosomes. karyotyping part 1, karyotyping part 2. DNA replication. Gene expression part 1. Gene expression part 2.[18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents . Various techniques were used such as. Data show , Microscope, Posters . Students do study the following fields: The differences between prokaryotic and eukaryotic cells. Cell membrane and wall. The organelles of the cell. Cell cycle and the cell division. Gene expression. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction to cell biology .
Week 2	cell theory.
Week 3	Prokaryotic cells
Week 4	eukaryotic cells
Week 5	Cell membrane structure
Week 6	Cell membrane function
Week 7	Cell wall structure
Week 8	Cell wall function
Week 9	Organelles : mitochondria ,plastids
Week 10	nucleus
Week 11	Ribosomes , lysosome , centrosome.
Week 12	golgy complex, ER
Week 13	Cell cycle
Week 14	mitosis
Week 15	meiosis

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: study the prokaryotic and eukaryotic cells.
Week 2	Lab 2: Measure the length of the cell
Week 3	Lab 3: Study the cell wall.
Week 4	Lab 4: modification and functions of plasma membrane.
Week 5	Lab 5: Study the cytoplasmic organelles part 1
Week 6	Lab 6: Study the cytoplasmic organelles part 2
Week 7	Lab 7: Study the cell division (mitosis)
Week 8	Lab 8: Study the cell division (meiosis)
Week 9	Lab9: Structures of chromosomes.

Week10	Lab 10: number and types of chromosomes.
Week 11	Lab 11: karyotyping part 1
Week 12	Lab 12: karyotyping part 2
Week 13	Lab 13: DNA replication
Week 14	Lab 14: Gene expression part 1
Week 15	Lab 15: Gene expression part 2

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Bickers World of the cell/ eighth edition/Hardin j. and *et.al* Human Genetics /seven edition /Ricki lewis	Yes Yes
Recommended Texts		
Websites	https://www.nature.com/scitable/topic/cell-biology-13906536/ https://www.youtube.com/watch?v=URUJD5NEXC8 https://www.sciencedirect.com/book/9780323341264/cell-biology	

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

Module Information معلومات المادة الدراسية					
Module Title	**Water Microbiology**			**Module Delivery**	
Module Type	**Core**			☒Theory ☐ Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	**Bio2-36025**				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	3		**Semester of Delivery**	6	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. Rayan Mazin		**e-mail**	rayanmazin@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Aws Ibrahim Sulaiman		**e-mail**	awssbio61@uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**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 Objectives أهداف المادة الدراسية	This study aims 1. Know the concepts of water microbiology. 2. Studying the economic and environmental importance of water microbes. 3. Knowing the effect of microorganisms on the environment and the interactive effect with higher organisms. 4. Studying the role of water organisms in the formation and erosion of soil and the cycle of carbon and nitrogen. 5. Discuss the vital relationships of water microbes.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Every student be able to isolation and identification microorganisms from several habitats. 2. Every student have a knowledge about the effect of microorganisms on public health. 3. Detect the water quality for sanitary using several practical techniques (MPN, MFT, Colilert system, etc.) 4. By studying the student, he was able to understand the scientific subject 5. Helping the student to master the conduct of scientific experiments and tests for the subject 6. Encouraging him to develop his scientific skills.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures I Introduction of water . Distribution of microorganisms1 in water. Bacteria in water. Virus in water, Algae in water. Parasite in water. [*10* hrs] Soil borne pathogens1 Minerals cycle 1 (Carbon(Minerals Cycle 2 (Nitrogen(. Bioremediation. [*8* hrs] Water Is the Largest Microbial Habitat Aquatic Viruses: Mortality at Sea Algae: the major microbial biomass in freshwater systems Water Borne Pathogens (Virus, Parasites and Fungi.[*10* hrs] Water Borne Pathogens (Bacteria(Water Quality and Public Health. Wastewater Treatment [8 hrs] Revision problem classes [3 hrs] Part B – Practical labs Introduction in practical water Microbiology. Contact slide assay . microbial population count in water & soil. Bacteria and Actinomycetes . Fungi. Isolation of antibiotic producer from water. measuring CO2 production. Algae enumeration. filament Fungi.. [18 hrs] Bacteriological examination of water, Coliform bacteria + E.coli.. Fecal Enterococcus. isolation the Shigella. isolation the Salmonella. isolation Vibrio cholera. isolation Pseudomonas . [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents .Students do study the following fields: Environmental microbiology : Water are the Largest Microbial Habitat properties of soil layers. Distribution of microorganisms . Bacteria in water. Virus in water .Algae in water. Parasite in water . water borne pathogens . Minerals cycles (Carbon, Nitrogen) .Aquatic Viruses: Mortality at S. Algae: the major microbial biomass in freshwater systems .Water Borne Pathogens .Virus .Bacteria . Parasites .Water Quality and Public Health .Collection of water samples for analysis .Wastewater Treatment. Bioremediation. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction of water and Soil
Week 2	properties of soil layers.
Week 3	Distribution of microorganisms1 in soil.
Week 4	Bacteria in soil. Virus in soil, Algae in soil. Parasite in soil.
Week 5	Soil borne pathogens1
Week 6	Minerals cycle 1 (Carbon)
Week 7	Minerals Cycle 2 (Nitrogen)
Week 8	Bioremediation
Week 9	Water Is the Largest Microbial Habitat
Week 10	Aquatic Viruses: Mortality at Sea
Week 11	Algae: the major microbial biomass in freshwater systems
Week 12	Water Borne Pathogens (Virus, Parasites and Fungi)
Week 13	Water Borne Pathogens (Bacteria)
Week 14	Water Quality and Public Health.
Week 15	Wastewater Treatment

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction in practical water &Soil Microbiology.
Week 2	Lab 2: Contact slide assay.
Week 3	Lab 3: microbial population count in water & soil.
Week 4	Lab 4: Bacteria and Actinomycetes
Week 5	Lab 5: Fungi.
Week 6	Lab 6: Isolation of antibiotic producer from soil .
Week 7	Lab 7: measuring CO2 production.
Week 8	Lab 8: Algae enumeration.
Week 9	Lab9: filament Fungi.
Week10	Lab 10: Bacteriological examination of water, Coliform bacteria + E.coli.

Week 11	Lab 11: Fecal Enterococcus.
Week 12	Lab 12: isolation the Shigella.
Week 13	Lab 13: isolation the Salmonella.
Week 14	Lab 14: isolation Vibrio cholera .
Week 15	Lab 15: isolation Pseudomonas .

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Procop, G. W., Church, D. L., Hall, G. S., & Janda, W. M. (2020). Koneman's color atlas and textbook of diagnostic microbiology. Jones & Bartlett Publishers.** **Tortora, G. J., Funke, B. R., & Case, C. L. (2015). Microbiology: an introduction. Pearson Higher Ed.** **Talaro, K., Chess, B., Wiersema, D. S., & Sen, P. (2013). *Foundations in Microbiology, 2012*. McGraw-Hill.** **Madigan, M. T., Clark, D. P., Stahl, D., & Martinko, J. M. (2010). Brock biology of microorganisms 13th edition. Benjamin Cummings.**	Yes Yes
Recommended Texts	**Microbiology : A laboratory Manual 12 th edition . Pearson .2th edition.** **General Microbiology lab Manual . memoir . 2018.**	Yes
Websites	https://uomustansiriyah.edu.iq/media/lectures/6/6_2022_01_14!03_48_06_PM.pdf https://www.uomustansiriyah.edu.iq/media/lectures/6/6_2022_10_17!04_41_57_AM.pdf	

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

Module Information معلومات المادة الدراسية					
Module Title	**Bacterial Physiology**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Bio2-36026**				
ECTS Credits	5				
SWL (hr/sem)	**125**				
Module Level		3	**Semester of Delivery**		6
Administering Department		Bio	**College**	Sci	
Module Leader	Dr Essra Ghanim Hazim Alsammak		**e-mail**	esrsbio19@uomosul.edu.iq	
Module Leader's Acad. Title		Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	Dr Enas Abdul Munieem Al-Layla		**e-mail**	**inasamuneem@uomosul.edu.iq**	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		1/10/2024	**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 Objectives أهداف المادة الدراسية	This study aims 1. Convey information to the student about the latest information on bacterial physiology. 2. The importance of the factors affecting its growth. 3 . Microstructure of a microbial c
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**1.the student know the bacterial structure .** **2.the function of each structure .** **3. how culture and study the feature of bacteria.** **4.The Students understood what is microbial growth curve** **5. The students were perfect in Detection of bacterial enzyme** **6. Try to improve their skills in Antimicrobial sensitivity test.**
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Define bacteria physiology and bacterial structure (The shape and size of bacteria. (Cell wall structure and function of gram positive and gram negative bacteria & Atypical cell wall include Archaea. . [*10* hrs] The structure out of the cell wall (Glycocalyx , s-layer, Pili and Fimbriae, flagella) chemotaxis. Cytoplasmic membrane function & structure for bacteria and Archaea. Cytoplasmic structure ,Nuclear area, inclusion bodes . Plasmid , ribosomes ,Spores structure. [*8* hrs] Nutrition macro& micronutrients, growth factor. Uptake of Nutrients by The Cell. Reproduction of bacterial cells. Protein Secretion system. Cellular Energy, Free Energy. Enzymes.[*10* hrs] .Respiratory Metabolism (Autotrophic & Heterotrophic Metabolism(. Glycolytic Pathways. Archaebacterial Glycolytic Pathways. Lipid Catabolism, Protein Catabolism. Tri carboxylic acid cycle (TCA Cycle). Oxidative Phosphorylation Fermentation. Oxygenic & An oxygenic Photosynthesis [8 hrs] Revision problem classes [3 hrs] Part B – Practical labs Introductin,Microbial growth curve and Mathmatics. Microbial growth factorsDetection of bacterial enzyme1. Detection of bacterial enzyme2. Detection of bacterial enzyme3. Detection of bacterial enzyme4. [18 hrs] Bacterial toxins1. Bacterial toxins2. Oxidation Reduction Reactions. Detection of fermentation metabolisims1. Detection of fermentation metabolisims2. Antimicrobial sensitivity tests 1. Antimicrobial sensitivity tests 2. API. VITEK. [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents . Various techniques were used such as. Data show , Microscope, Posters . Students do study the following fields: Bacterial structure . Function of each structure .Types of nutrition. Source of energy. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري

	Material Covered
Week 1	Define bacteria physiology and bacterial structure (The shape and size of bacteria) .
Week 2	Cell wall structure and function of gram positive and gram negative bacteria & Atypical cell wall include Archaea.
Week 3	The structure out of the cell wall (Glycocalyx , s-layer, Pili and Fimbriae, flagella) chemotaxis .
Week 4	Cytoplasmic membrane function & structure for bacteria and Archaea .
Week 5	Cytoplasmic structure ,Nuclear area, inclusion bodes . Plasmid , ribosomes ,Spores structure .
Week 6	Nutrition macro& micronutrients, growth factor. Uptake of Nutrients by The Cell.
Week 7	Reproduction of bacterial cells.
Week 8	Protein Secretion system.
Week 9	Cellular Energy, Free Energy.Enzymes .
Week 10	Respiratory Metabolism (Autotrophic & Heterotrophic Metabolism.)
Week 11	Glycolytic Pathways.
Week 12	Archaebacterial Glycolytic Pathways. Lipid Catabolism, Protein Catabolism.
Week 13	Tri carboxylic acid cycle (TCA Cycle). Oxidative Phosphorylation
Week 14	Fermentation.
Week 15	Oxygenic & An oxygenic Photosynthesis

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introductin,Microbial growth curve and Mathmatics .
Week 2	Lab 2: Microbial growth factors
Week 3	Lab 3: Detection of bacterial enzyme1
Week 4	Lab 4: Detection of bacterial enzyme2
Week 5	Lab 5: Detection of bacterial enzyme3
Week 6	Lab 6: Detection of bacterial enzyme4
Week 7	Lab 7: Bacterial toxins1
Week 8	Lab 8: Bacterial toxins2

Week 9	Lab9: Oxidation Reduction Reactions
Week10	Lab 10: Detection of fermentation metabolisims1
Week 11	Lab 11: Detection of fermentation metabolisims2
Week 12	Lab 12: Antimicrobial sensitivity tests 1
Week 13	Lab 13: Antimicrobial sensitivity tests 2
Week 14	Lab 14: API
Week 15	Lab 15: VITEK

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Riedel ,S., Morse, S.A., Mietzner, T., Miller ,S. (2019). Jawetz,Melnick & Adelberg s Medical Microbiology.28th ed. McGraw-Hill Companies, U.S.A.** **Gerard J. Tortora , Berdell R. Funke ,Christine L. Case .(2013) Microbiology An Introduction, 11ed .** **Willey ,J.M .; Sherwood,L.M.; Woolverton, C.J (2017). Prescott s Microbiology. 10th ed., McGraw-Hill Companies, U.S.A.** **Winn, W. C.; Allen.; S. D. J.; Janda, W. U.; Koneman, E. W.; Procop, G. W.; Schreckenbenberger, P. C. and Woods, G. L. (2006). " Koneman's Color Atlas and Text Book of Diagnostic Microbiology". 6th ed., Lippincott Williams and Wilkins, U.S.A.**	Yes Yes
Recommended Texts	**Benson's Microbiological Applications: Laboratory Manual in General Microbiology.** **Laboratory Manual of experimental by Ronald**	Yes
Websites	https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/microbial-physiology https://www.wur.nl/en/research-results/chair-groups/agrotechnology-and-food-sciences/biomolecular-sciences/laboratory-of-microbiology/research/microbial-physiology.htm	

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

Module Information معلومات المادة الدراسية					
Module Title	**Animal Physiology**			**Module Delivery**	
Module Type	**Core**			☒Theory ☐ Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	**Bio2-36027**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	3		**Semester of Delivery**	6	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. Muntaha Mahmood		**e-mail**	muntsbio17@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Abeer Attaala Aeed		**e-mail**	**abesbio53@uomosul.edu.iq**	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**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 Objectives أهداف المادة الدراسية	This study aims 1. The student's comprehension of the concept of the course and his ability to distinguish between it and other sciences. 2. Addressing a comprehensive description of the various body systems, with a focus on ruminant field animals and poultry. 3. Studying the vital processes that occur in the animal's body that transform the nutrients that the animal eats and turn them into animal products or other secondary waste. 4. Basic and physiology of growth and reproduction. 5. Keep up with the development that is happening in the world
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. The students understand different physiological mechanisms in the body. 2. Help the students to master the interaction and relationships between body systems. 3. The development of student's skills for going into relationship between the physiological and pathological disorders. 4. The students understand mode of action each physiological test. 5. Help the students to master the procedure of each physiological test. 6. The development of student's skills for going into the laboratory work experience as specialist who has an excellent background on all physiological tests and their relationship to disease and not as technician operating advice.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Introduction to Physiology. Cell physiology. The mechanisms of transports across the cell membrane. Phagocytosis mechanism. Pinocytosis mechanism. [*10* hrs] Blood physiology. Physical Characteristics of blood. Plasma, Erythrocytes, Erythropoiesis. erythrocyte disorders. Types of anemia. Leukocytes. Functions of all types of Leukocytes. Platelets, Hemostasis mechanism, Fibrinolysis.[*18*hrs] Physiology of Digestion system. Functions of the Digestive System. Nervous Regulation of the Digestive System. Function of Stomach. Regulation of Gastric Secretion. Pancreas. Gall Bladder. Small Intestine. Large intestine [18hrs] Revision problem classes [3 hrs] Part B – Practical labs General safety instructions in the laboratory. Introduction Circulatory system. Fragility test 1. Fragility test 2. Total Red Blood Cell count. differential count. Estimation Hemoglobin. [18 hrs] PCV test. Platelets count. : ESR test. Bleeding time Test. Blood pressure. Physiological and pathological variation of Blood pressure. Blood groups. Respiratory test.[18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents . Various techniques were used such as. Data show , Microscope, Posters . Students do study the following fields: An introduction to the study of Physiology of the body. Definition of body systems and understands how this system work under normal conditions. Definition of the techniques uses to estimation of body parameters. Study the disorders of this systems physiology and study the diseases results from disorders in homeostats. The relationships between the different body systems. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction to Physiology.
Week 2	Cell physiology.
Week 3	The mechanisms of transports across the cell membrane.
Week 4	Phagocytosis mechanism. Pinocytosis mechanism.
Week 5	Blood physiology.
Week 6	Physical Characteristics of blood. Plasma, Erythrocytes, Erythropoiesis.
Week 7	erythrocyte disorders.
Week 8	Types of anemia. Leukocytes.
Week 9	Functions of all types of Leukocytes.
Week 10	Platelets, Hemostasis mechanism, Fibrinolysis.
Week 11	Physiology of Digestion system.
Week 12	Functions of the Digestive System.
Week 13	Nervous Regulation of the Digestive System. Function of Stomach. Regulation of Gastric Secretion.
Week 14	Pancreas. Gall Bladder.
Week 15	Small Intestine. Large intestine.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: General safety instructions in the laboratory.
Week 2	Lab 2: Introduction Circulatory system.
Week 3	Lab 3: Fragility test 1.
Week 4	Lab 4: Fragility test 2.
Week 5	Lab 5: Total Red Blood Cell count.
Week 6	Lab 6: differential count.
Week 7	Lab 7: Estimation Hemoglobin.
Week 8	Lab 8: PCV test.
Week 9	Lab9: Platelets count.
Week10	Lab 10: ESR test.
Week 11	Lab 11: Bleeding time Test.
Week 12	Lab 12: Blood pressure.
Week 13	Lab 13: Physiological and pathological variation of Blood pressure.
Week 14	Lab 14: Blood groups.
Week 15	Lab 15: Respiratory test.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Guyton, A. and Hall, J.E. (2016). "Text book of physiology". 11th ed. Elsevier Saunders. China.** **Barrett, K.; brooks, H.; Boitano, S. and Barman, S. (2010). "Ganong's eview of Medical Physiology". 23 th edition. McGraw Hill Companies. New York**	Yes Yes
Recommended Texts	**Ghia, CL. (2013). A Textbook of Practical Physiology. Jaypee Brothers Medical Publishers (P) Ltd.; 8th edition.**	No
Websites	https://www.nature.com/subjects/animal-physiology https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/animal-physiology	

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

Module Information معلومات المادة الدراسية					
Module Title	**Pollution**			**Module Delivery**	
Module Type	**Core**			☒Theory ☒ Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	**Bio2-36128**				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	3		**Semester of Delivery**	6	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. Abdulmoneim Mohammed Ali Kannah		**e-mail**	abmsbio38@gmail.com	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Mahmood Esmaeel Enas Qusay		**e-mail**	Mahmoodaljubory76@gmail.com	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Ecology	**Semester**	5
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	This study aims 1. The student's knowledge of the concept of pollution, its causes, types, risks, and how to reduce pollution. 2. Knowing the negative effects of pollutants on the environment and human health. 3. Identify the harmful effects of pesticides, fertilizers, oil and others. 4. Identify solid waste, its types, damages, and disposal methods. 5. Identify the types of radiation and radioactive pollution, its sources and its biological damage. 6. Learn about the concept of the ecosystem and its components. 7. Introducing the concept of environmental pollution and the factors contributing to it. 8. Clarify the dangers and consequences of environmental pollution.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. How to deal with any environmental problem and control the problem within the limits of capabilities. 2. Understanding and distinguishing the types of factors and substances that contribute to the pollution of the ecosystem. 3.Every student be able to knowledge about environment and how pollution it. 4. Every student be able to chemical analysis water. 5. The student should be able to collect and summarize useful information related to a study. 6. The student proposes solutions to some environmental problems within the framework of protecting and preserving them. 7 . That the student has the ability to work in a team.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> General introduction; definition. pollution types .Point sources & non-point sources of pollution . Water pollution . Major pollutant. [*16* hrs] Major pollutant: The hydrocarbons Agricultural pollution. The solid waste. Thermal pollution. Air pollution .[*10* hrs] The greenhouse phenomenon. Acid rains. Thermal inversion. Noise pollution. Radiation pollution. Personal pollution. Visual Pollution. [12 hrs] Revision problem classes [3 hrs] <u>Part B – Practical labs</u> Identifying the laboratory pollution.The Science of meteorological. Determination residual chlorine in the water. Determination chloride in the water. Determination

	BOD5 in the water. Determination COD. In the water. Determination nitrate in the water. [18 hrs] Determination phosphate in the water. Determination Sulphate in the water. Determination silica in the water. Relations between organisms. Field capacity of soil . Soil color. Soil Texture. Determination heavy metal in the water,1. Determination heavy metal in the water,2.. [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents Students do study the following fields: Introduction of pollution. Types of pollution. The pollutants. Water Pollution. Soil Pollution. Noise Pollution. Introduction of Lab pollution. Identify the types of water pollutants. Able to physical and chemical analysis for water. Most students were active in our classes and interactive between them and us also. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	General introduction; definition. pollution types.
Week 2	Point sources & non-point sources of pollution
Week 3	Water pollution.
Week 4	Major pollutant. Major pollutant:The hydrocarbons
Week 5	Agricultural pollution.
Week 6	The solid waste.
Week 7	Thermal pollution.
Week 8	Air pollution
Week 9	The greenhouse phenomenon.
Week 10	Acid rains.
Week 11	Thermal inversion.
Week 12	Noise pollution.
Week 13	Radiation pollution.
Week 14	Personal pollution.
Week 15	Visual Pollution.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Identifying the laboratory pollution.
Week 2	Lab 2: The Science of meteorological.
Week 3	Lab 3: Determination residual chlorine in the water.
Week 4	Lab 4: Determination chloride in the water.
Week 5	Lab 5: Determination BOD_5 in the water.
Week 6	Lab 6: Determination COD. In the water.
Week 7	Lab 7: Determination nitrate in the water.
Week 8	Lab 8: Determination phosphate in the water.

Week 9	Lab9: Determination Sulphate in the water.
Week10	Lab 10: Determination silica in the water.
Week 11	Lab 11: Relations between organisms.
Week 12	Lab 12: Field capacity of soil.
Week 13	Lab 13: Soil color. Soil Texture.
Week 14	Lab 14: Determination heavy metal in the water,1.
Week 15	Lab 15: Determination heavy metal in the water,2.

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**STANDER METHODS FOR EXAMINATION OF WATER AND WASTEWATER. BY RODGER B. , ANDRRRREW D. AND EUGENE W. (2017).** **ENVIRONMENT ANALYSIS . BY PRADYOT PATNAIK .(2010)**	Yes Yes
Recommended Texts	**Understanding Environmental Pollution. (2020).** Marquita K. Hill.	No
Websites	https://www.britannica.com/science/pollution-environment https://www.eea.europa.eu/en/topics/in-depth/pollution	

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

Module Information معلومات المادة الدراسية					
Module Title	**Genetics**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Bio2-36129**				
ECTS Credits	3				
SWL (hr/sem)	**75**				
Module Level	3		**Semester of Delivery**	6	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. Hiba Khalid mahmood		**e-mail**	hebsbio59@uomosul.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Mowaffaq Khaleel		**e-mail**	mufsbio62@uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Cell Biology	**Semester**	5
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	This study aims 1. Introduce the student to the science of genetics, its branches, and its importance. 2. Introducing the student to the science of genetics, its branches, and its importance. 3. Introduce the student to the cytological structure of the plant cell, with a focus on the cell nucleus, its genetic components and functions. 4. Knowledge of Mendel laws and their applications. 5. The student is familiar with the identification of genetic factors and the extent of their influence genetically. 6. Giving the student the necessary experience and skills in the field of basics of genetics in general.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. To enable students to understand the genetics 2. Help the student to understand the law of genetics 3. Encourage the student to develop their study skills. 4. The students must know the traits of pea plant studied by Mendel. 5. The students must understand the solution method of genetic problem. 6. The students must learn the genetic disease.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> Introduction in Genetics. Basic Genetics , Genetic Terminology. The Physical Basis of Heredity. Effects of the Environment on genetics.[*10* hrs] Mendel's Studies. allelic relationship. Determination of Sex. sex- linked inheritance. [*8* hrs] Cytogenetic : Changes I Structure of Chromosomes. Changes in Chromosomes Number. [*10* hrs] Gene mutation. Genes in Individuals. Linkage. Crossing Over. Mapping of Chromosomes. [8 hrs] Revision problem classes [3 hrs] <u>Part B – Practical labs</u> The characters of the best organism for the genetic studies. The traits of pea plant. Mendels first law and solution of genetic problems. Mendels second law and solution of genetic problems. Punnet squares and solution of genetic problems. Part 1 Punnet squares and solution of genetic problems. part 2 . Mendel's characters in human, solution of genetic problems. the characters link with sex, solution of genetic problems. [18 hrs] Pedigree analysis, solution of genetic problems. Forked line method. solution of genetic problems. Diagnosis of genetic disease. solution of genetic problems. The corn plant Drosophila. [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents . Various techniques were used such as. Data show , Microscope, Posters,. Students do study the following fields: Genetic traits inherit from parents. Mendel's laws. The genetic diseases. Pedigree analysis. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction in Genetics
Week 2	Basic Genetics , Genetic Terminology
Week 3	The Physical Basis of Heredity.
Week 4	Effects of the Environment on genetics.
Week 5	Mendel's Studies.
Week 6	allelic relationship.
Week 7	Determination of Sex.
Week 8	sex- linked inheritance
Week 9	Cytogenetic : Changes in Structure of Chromosomes.
Week 10	Changes in Chromosomes Number.
Week 11	Gene mutation.
Week 12	Genes in Individuals
Week 13	Linkage
Week 14	Crossing Over.
Week 15	Mapping of Chromosomes.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: The characters of the best organism for the genetic studies .
Week 2	Lab 2: The traits of pea plant.
Week 3	Lab 3: Mendels first law and solution of genetic problems.
Week 4	Lab 4: Mendels second law and solution of genetic problems.
Week 5	Lab 5: Punnet squares and solution of genetic problems. Part 1
Week 6	Lab 6: Punnet squares and solution of genetic problems. part 2
Week 7	Lab 7: Mendel's characters in human, solution of genetic problems.
Week 8	Lab 8:. the characters link with sex, solution of genetic problems.
Week 9	Lab9: Pedigree analysis, solution of genetic problems.

Week10	Lab 10: Forked line method.
Week 11	Lab 11: solution of genetic problems.
Week 12	Lab 12: Diagnosis of genetic disease.
Week 13	Lab 13: solution of genetic problems.
Week 14	Lab 14: The corn plant
Week 15	Lab 15: Drosophila

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Human Genetics /seven edition /Ricki Lewis** **Beckers World of the cell / eighth edition/ Hardin j. and *et.al.***	Yes Yes
Recommended Texts	Human Genetics and Genomics Bruce R. Korf, 2007	No
Websites	https://nigms.nih.gov/education/fact-sheets/Pages/genetics.aspx https://kidshealth.org/en/parents/about-genetics.html	

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

Module Information معلومات المادة الدراسية					
Module Title	**Animal Physiology1**			**Module Delivery**	
Module Type	**Core**			☒Theory ☒ Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	**Bio1-47031**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	3		**Semester of Delivery**	7	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. Muntaha Mahmood		**e-mail**	muntsbio17@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Abeer Attaala Aeed		**e-mail**	**abesbio53@uomosul.edu.iq**	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**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 Objectives أهداف المادة الدراسية	This study aims 1. The student's comprehension of the concept of the course and his ability to distinguish between it and other sciences. 2. Addressing a comprehensive description of the various body systems, with a focus on ruminant field animals and poultry. 3. Studying the vital processes that occur in the animal's body that transform the nutrients that the animal eats and turn them into animal products or other secondary waste. 4. Basic and physiology of growth and reproduction. 5. Keep up with the development that is happening in the world
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. The students understand different physiological mechanisms in the body. 2. Help the students to master the interaction and relationships between body systems. 3. The development of student's skills for going into relationship between the physiological and pathological disorders. 4. The students understand mode of action each physiological test. 5. Help the students to master the procedure of each physiological test. 6. The development of student's skills for going into the laboratory work experience as specialist who has an excellent background on all physiological tests and their relationship to disease and not as technician operating advice.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Introduction to Physiology. Cell physiology. The mechanisms of transports across the cell membrane. Phagocytosis mechanism. Pinocytosis mechanism. [*10* hrs] Blood physiology. Physical Characteristics of blood. Plasma, Erythrocytes, Erythropoiesis. erythrocyte disorders. Types of anemia. Leukocytes. Functions of all types of Leukocytes. Platelets, Hemostasis mechanism, Fibrinolysis.[*18*hrs] Physiology of Digestion system. Functions of the Digestive System. Nervous Regulation of the Digestive System. Function of Stomach. Regulation of Gastric Secretion. Pancreas. Gall Bladder. Small Intestine. Large intestine [18hrs] Revision problem classes [3 hrs] Part B – Practical labs General safety instructions in the laboratory. Introduction Circulatory system. Fragility test 1. Fragility test 2. Total Red Blood Cell count. differential count. Estimation Hemoglobin. [18 hrs] PCV test. Platelets count. : ESR test. Bleeding time Test. Blood pressure. Physiological and pathological variation of Blood pressure. Blood groups. Respiratory test.[18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents . Various techniques were used such as. Data show , Microscope, Posters . Students do study the following fields: An introduction to the study of Physiology of the body. Definition of body systems and understands how this system work under normal conditions. Definition of the techniques uses to estimation of body parameters. Study the disorders of this systems physiology and study the diseases results from disorders in homeostats. The relationships between the different body systems. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

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

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction to Physiology.
Week 2	Cell physiology.
Week 3	The mechanisms of transports across the cell membrane.
Week 4	Phagocytosis mechanism. Pinocytosis mechanism.
Week 5	Blood physiology.
Week 6	Physical Characteristics of blood. Plasma, Erythrocytes, Erythropoiesis.
Week 7	erythrocyte disorders.
Week 8	Types of anemia. Leukocytes.
Week 9	Functions of all types of Leukocytes.
Week 10	Platelets, Hemostasis mechanism, Fibrinolysis.
Week 11	Physiology of Digestion system.
Week 12	Functions of the Digestive System.
Week 13	Nervous Regulation of the Digestive System. Function of Stomach. Regulation of Gastric Secretion.
Week 14	Pancreas. Gall Bladder.
Week 15	Small Intestine. Large intestine.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: General safety instructions in the laboratory.
Week 2	Lab 2: Introduction Circulatory system.
Week 3	Lab 3: Fragility test 1.
Week 4	Lab 4: Fragility test 2.
Week 5	Lab 5: Total Red Blood Cell count.
Week 6	Lab 6: differential count.
Week 7	Lab 7: Estimation Hemoglobin.
Week 8	Lab 8: PCV test.
Week 9	Lab9: Platelets count.
Week10	Lab 10: ESR test.
Week 11	Lab 11: Bleeding time Test.
Week 12	Lab 12: Blood pressure.
Week 13	Lab 13: Physiological and pathological variation of Blood pressure.
Week 14	Lab 14: Blood groups.
Week 15	Lab 15: Respiratory test.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Guyton, A. and Hall, J.E. (2016). "Text book of physiology". 11th ed. Elsevier Saunders. China.** **Barrett, K.; brooks, H.; Boitano, S. and Barman, S. (2010). "Ganong's eview of Medical Physiology". 23 th edition. McGraw Hill Companies. New York**	Yes Yes
Recommended Texts	**Ghia, CL. (2013). A Textbook of Practical Physiology. Jaypee Brothers Medical Publishers (P) Ltd.; 8th edition.**	No
Websites	https://www.nature.com/subjects/animal-physiology https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/animal-physiology	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
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	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

Module Information معلومات المادة الدراسية					
Module Title	**Plant Physiology1**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Bio1-47032**				
ECTS Credits	5				
SWL (hr/sem)	**125**				
Module Level	3		**Semester of Delivery**	7	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. Nihal E. Al-Taee		**e-mail**	Nehsbio34@uomosul.edu.iq	
Module Leader's Acad. Title	Assit. Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Nihal E. Al-Taee Dr. Wasan Salih Hussain		**e-mail**	Nehsbio34@uomosul.edu.iq **wassbio54@uomosul.edu.iq**	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**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 Objectives أهداف المادة الدراسية	This study aims 1. Definition of physiology. 2. Studying plant cell structure and function of different cellular organelles. 3. Study of water relations. 4. Study the importance of mineral elements for plants. 5. Brief study of structural and catabolic metabolism.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. He prepares samples of plant tissue to study the plant cell under a microscope. 2. Study the properties of water. 3. And how to prepare solutions and study the phenomenon of diffusion, osmosis and plasma. 4. Prepare experiments to study how water and nutrients move. 5. Discusses how each plant organ performs its different functions. 6. The relationship of each part of the plant to the other. 7. Explain the different ways of absorbing and transporting water in plants. 8. And how plants sweat differentiate between plant needs of mineral elements. 9. That the student be able to understand the different parts of the plant body and their relationship to the concept of physiology. 10. Realizing the importance of water and distinguishing between the mechanism of uptake, transport and loss of water from plants. 11. The ability to understand the mechanism of absorption of nutrients.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures I Introduction to plant physiology. Solutions Types. ، Solutions : properties. Solutions : Preparation. Plant Water relations. properties of water and its importance. [*10* hrs] Diffusion, define,factors affecting on diffusion, importance. Imbibition, Conditions necessary for imbibition, Factors affecting on imbibition,Impotance of imbibition [*8* hrs] Osmosis ,Conditions in Osmosis Water potential. components of water potential. Permeability,types of membrans, General rules of permeability.Impotance o permeability Water potential and their components. [*10* hrs] Tranclocation, Pathway of water transport. Transpiration(types,mechanism ، theory, Guttation, Bleeding, [8 hrs] Revision problem classes [3 hrs] Part B – Practical labs

	Study of Osmosis. Permeability. Permeability, define,factors affecting, rules for permeability, importance Osmosis, Conditions in Osmosis Water potential, components of water potential. Ways of solutes entry and transport through the plant cells membranes,simple and Facilitated diffiusion, active transport . Transpiration.Types of transpiration Stomata, Structure of stomata, Number of Stomata (Stomatal Frequency). [18 hrs] Mechanism of transpiration, Stomatal movement, Role of transpiration. Phytohormones are chemical messengers that coordinate cellular activities. This lecture introduces the plant hormones (auxin, cytokinin, gibberellic acid, brassinosteroids, ethylene, abscisic acid, salicylic acid and jasmonic acid) through their roles, during the plants life, from seed-to-seed.Photosynthesis is the process by which plants use sunlight, water, and carbon dioxide to create oxygen and energy in the form of sugar. [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents .Students do study the following fields: Solution, Types(True,colloidal,suspension,Eumlsion) . Colloidal systems, properties, Buffer solution. Plant water relationship,properties of water,Diffusion,define,factors affecting on diffusion, importance . Imbibition, define,factors affecting, Conditions necessary for imbibition, importance . Permeability, define,factors affecting, rules for permeability, importance Osmosis, Conditions in Osmosis Water potential, components of water potential. Ways of solutes entry and transport through the plant cells membranes,simple and Facilitated diffiusion, active transport Relationship between plants and environment, Absorption of water and solutes by plants roots, Factors affecting water absorption by root . Water and minerals transport in plant(Translocation), Pathway of water transport Mechanisms (theory) of water and its solute transport, Root pressure, Transpiration pulls, Cohesion-Adhesion theory, Guttation, Bleeding . Transpiration.Types of transpiration Stomata, Structure of stomata, Number of Stomata (Stomatal Frequency). Mechanism of transpiration, Stomatal movement, Role of transpiration. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1

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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction to plant physiology
Week 2	Solutions Types, .
Week 3	Solutions : properties.
Week 4	Solutions : Preparation.
Week 5	Plant Water relations.
Week 6	properties of water and its importance.
Week 7	Diffusion, define,factors affecting on diffusion, importance **.**
Week 8	Imbibition, Conditions necessary for imbibition, Factors affecting on imbibition,Impotance of imbibition
Week 9	Osmosis ,Conditions in Osmosis Water potential.
Week 10	components of water potential.

Week 11	Permeability,types of membrans, General rules of permeability.Impotance of permeablity
Week 12	Water potential and their components.
Week 13	Tranclocation, Pathway of water transport.
Week 14	Transpiration(types,mechanism,
Week 15	theory, Guttation, Bleeding,

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Study of Osmosis part 1.
Week 2	Lab 2: Study of Osmosis part 2.
Week 3	Lab 3: Permeability part 1.
Week 4	Lab 4: Permeability part 2.
Week 5	Lab 5: Transpiration part 1.
Week 6	Lab 6: Transpiration part 2.
Week 7	Lab 7: Respiration part 1.
Week 8	Lab 8: Respiration part 2.
Week 9	Lab9: Dormancy part 1.
Week10	Lab 10: Dormancy part 2.
Week 11	Lab 11: Phytohormones part 1.
Week 12	Lab 12: Phytohormones part 2.
Week 13	Lab 13: Photosynthesis part 1.
Week 14	Lab 14: Photosynthesis part 2.
Week 15	Lab 15: Photosynthesis part 3.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**D**uca M.(2015) Plant Physiology Bhatla S.C.and Lal M.A.(2018) Plant Physiology,Development and Metabolism . Plant Physiology(2011). edited by Philip Stewart, Sabine Globig	Yes Yes

		Yes
Recommended Texts	**Practical Plant Physiology(2021)** Frederick Keeble, M. C. Rayner	Yes
Websites	https://academic.oup.com/plphys https://www.sciencedirect.com/topics/medicine-and-dentistry/plant-physiology	

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

Module Information معلومات المادة الدراسية					
Module Title	**Molecular Biology**			**Module Delivery**	
Module Type	**Core**			☒Theory ☒ Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	**Bio1-47035**				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	4		**Semester of Delivery**	7	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. Sarab Daoud Sulayman		**e-mail**	sarsbio14@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Sahar Luqman Dr. Sahira Adrees		**e-mail**	sahira.scp5@student.uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**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 Objectives أهداف المادة الدراسية	This study aims 1. Understand the principles of biology at the molecular level. 2. Identifying the molecular structure of nucleic acids, their replication and their role in building protein 3. Understanding methods of controlling the level of gene expression in living cells. 4. Developing the student's perceptions by giving him an idea of recent trends in molecular biology. 5. Learn about modern applications of molecular genetics in various fields of life 6. Realizing the great progress in molecular genetics and its impact on human life.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1.Help the students to understands the genetic material nature and how it can be duplicated and transferred to the following off spring 2. Develops the students own skills to deal with genetic material and the mechanisms of its extraction and diagnosis different damage 3. Encourage students to discuss various problems and possible disease that occurred due to specific DNA Damages. 4. The students learn what are the advantages of DNA and RNA extraction. 5. The students know the types of cell disruption and distinguish between these types. 6. The students can distinguish between molecular techniques and other technique.
Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following. <u>Part A – Theoretical lectures</u> Chemical structure**.** physical properties of Nucleic acids**.** DNA REPLICTION1**.** DNA REPLICTION2**.** Transcription of prokaryotic DNA1**.** Transcription of prokaryotic DNA2**.**[*10* hrs] , prokaryotic transcription**.** eukaryotic transcription**.** Translation in prokaryotics1**.** Translation in prokaryotics2**.**[*8* hrs] Main differences between pro and eukaryotic translation1**.** Main differences between pro and eukaryotic translation2**.** Pro and eukaryotic gene structure**.**[*10* hrs] Gene expression.1**.** Gene expression2. [8 hrs] Revision problem classes [3 hrs] <u>Part B – Practical labs</u> Introduction of information about laboratory safety**.**Introduction of cell disruption**.**DNA extraction **.**RNA extraction**.**Detection RNA and DNA.1**.**Detection RNA and DNA2**..**Estimation of DNA concentration and purity1**.**Estimation of DNA concentration and purity2**.** [18 hrs] PCR technique1**.**PCR technique2**.**Gel electrophoresis1**.**Gel electrophoresis2**.**Molecular techniques.1**.**Molecular techniques2**.**Molecular techniques3. [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents . Various techniques were used such as. Data show , Microscope, Posters Students do study the following fields: DNA Chemical structure and physical properties. Eukaryotic and Prokaryotic chromosome organization and packaging. Prokaryotic replication of DNA and eukaryotic differences. Protein synthesis , Transcription and Translation. Prokaryotic and eukaryotic gene structure.. Prokaryotic and eukaryotic gene expression (LAC Operon). This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Chemical structure .
Week 2	physical properties of Nucleic acids.
Week 3	DNA REPLICTION1.
Week 4	DNA REPLICTION2.
Week 5	Transcription of prokaryotic DNA1.
Week 6	Transcription of prokaryotic DNA2.
Week 7	prokaryotic transcription.
Week 8	eukaryotic transcription.
Week 9	Translation in prokaryotics1.
Week 10	Translation in prokaryotics2.
Week 11	Main differences between pro and eukaryotic translation1.
Week 12	Main differences between pro and eukaryotic translation2.
Week 13	Pro and eukaryotic gene structure.
Week 14	Gene expression.1.
Week 15	Gene expression2.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction of information about laboratory safety.
Week 2	Lab 2: Introduction of cell disruption.
Week 3	Lab 3: DNA extraction.
Week 4	Lab 4: RNA extraction.
Week 5	Lab 5: Detection RNA and DNA.1.
Week 6	Lab 6: Detection RNA and DNA2..
Week 7	Lab 7: Estimation of DNA concentration and purity1.
Week 8	Lab 8:. Estimation of DNA concentration and purity2.

Week 9	Lab9: PCR technique1.
Week10	Lab 10: PCR technique2.
Week 11	Lab 11: Gel electrophoresis1.
Week 12	Lab 12: Gel electrophoresis2.
Week 13	Lab 13: Molecular techniques.1.
Week 14	Lab 14: Molecular techniques2.
Week 15	Lab 15: Molecular techniques3.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**1- Vennison, S. J.(2009). Laboratory Manual for Genetic Engineering.** **2- O'Grady,S. et.al., (2011).Molecular Biology Techniques Laboratory Manual..** **3- Harish, P.(1992).Association for biology Education.** **4-Nucleic acid detection, ultrasensitive fluorescent, gel stains and quantitation reagents.** **5- Amin-ul Mannan, M. ; Sharma, S. and Ganesan , K. (2009). Total RNA isolation from recalcitrant yeast cells. Analytical Biochemistry, 389: 77-79.**	Yes No Yes NO Yes
Recommended Texts	**6- Maniatis, T.; Fritsch, E.F. and Sambrook, J. (1982). Molecular Cloning: A Laboratory Manual, Cold Spring Harbor Laboratory, Cold Springs Harbor, NY.**	Yes
Websites	www.zoo.utoronto.ca/able https:// www.austince.edu	

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

Module Information معلومات المادة الدراسية					
Module Title	**Research Methodology**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Bio1-47036**				
ECTS Credits	2				
SWL (hr/sem)	**50**				
Module Level		4	**Semester of Delivery**		7
Administering Department		Bio	**College**	Sci	
Module Leader	Dr. Rojan Ghanim		**e-mail**	rojsbio57@uomosul.edu.iq	
Module Leader's Acad. Title		Assist. Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor			**e-mail**		
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		1/10/2024	**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 Objectives أهداف المادة الدراسية	**This study aims** The objectives of the basics of scientific research encompass a range of foundational goals aimed at equipping individuals with the skills, knowledge, and mindset necessary for effective inquiry. Here's an organized breakdown: 1. **Understand Scientific Inquiry**: Grasp the systematic process of asking questions, investigating phenomena, and refining knowledge through structured methods. 2. **Develop Critical Thinking**: Cultivate the ability to analyze information, evaluate evidence, and reason logically to draw objective conclusions. 3. **Formulate Hypotheses/Questions**: Learn to craft testable hypotheses and research questions that guide investigations. 4. **Master Methodologies**: Gain proficiency in qualitative, quantitative, experimental, and observational research designs. 5. **Acquire Data Skills**: Learn techniques for collecting, organizing, and analyzing data using appropriate statistical or thematic tools. 6. **Uphold Ethics**: Adhere to integrity, transparency, and responsibility in research, including informed consent and data privacy. 7. **Communicate Findings**: Effectively share results through academic writing, presentations, and visualizations for peer and public engagement. 8. **Enhance Problem-Solving**: Apply structured approaches to address complex issues and propose evidence-based solutions. 9. **Expand Knowledge**: Contribute new insights to existing literature, driving intellectual and practical advancements. 10. **Support Evidence-Based Decisions**: Provide reliable data to inform policies, practices, and innovations across fields. 11. **Foster Innovation**: Stimulate technological and conceptual breakthroughs by exploring uncharted territories. 12. **Encourage Collaboration**: Promote teamwork and peer review to validate research quality and foster interdisciplinary progress. 13. **Nurture Curiosity**: Inspire a passion for discovery and openness to exploring novel ideas and challenges. 14. **Critique Literature**: Evaluate existing studies to identify gaps, biases, and opportunities for further research. 15. **Bridge Theory and Practice**: Apply theoretical frameworks to real-world problems, ensuring research relevance and impact. 16. **Promote Lifelong Learning**: Embrace continuous skill development and adaptability in an evolving scientific landscape.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**Module Learning Outcomes of *Basics of Scientific Research*** By the end of this module, learners will be able to: 1. **Demonstrate understanding of the scientific method** Explain the systematic steps of scientific inquiry (observation,

hypothesis, experimentation, analysis, conclusion).

2. **Formulate research questions and hypotheses**
   Design clear, testable, and focused research questions or hypotheses aligned with a defined problem or gap in knowledge.

3. **Select appropriate research methodologies**
   Compare qualitative, quantitative, experimental, and observational methods and choose the best fit for a research objective.

4. **Design a research proposal**
   Outline a structured research plan, including objectives, methodology, tools, timelines, and ethical considerations.

5. **Apply data collection and analysis techniques**
   Use tools (e.g., surveys, experiments, interviews) to gather data and apply basic statistical or thematic analysis to interpret results.

6. **Critically evaluate research literature**
   Analyze existing studies to identify strengths, weaknesses, gaps, and biases, and contextualize findings within broader scholarship.

7. **Adhere to ethical standards in research**
   Recognize ethical dilemmas (e.g., plagiarism, confidentiality, consent) and apply ethical guidelines to research design and execution.

8. **Communicate research findings effectively**
   Present results through academic writing, visual aids (charts, graphs), and oral presentations tailored to diverse audiences.

9. **Apply critical thinking to problem-solving**
   Evaluate evidence, identify logical fallacies, and propose evidence-based solutions to real-world or theoretical problems.

10. **Collaborate in peer-review processes**
    Provide constructive feedback on others' work and incorporate peer insights to refine research quality and validity.

11. **Use technology for research efficiency**
    Leverage digital tools (e.g., reference managers, data analysis software) to enhance research productivity and accuracy.

12. **Connect theory to practice**
    Translate theoretical concepts into practical research applications that address societal, environmental, or technical challenges.

13. **Develop a growth mindset for lifelong learning**

	Reflect on research experiences to identify areas for improvement and commit to continuous skill development in scientific inquiry.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> 1. Introduction to Scientific Research 2. The Scientific Method and Inquiry Process 3. Formulating Research Questions and Hypotheses 4. Research Design and Methodology 5. Literature Review and Critical Analysis 6. Data Collection Techniques 7. Data Analysis and Interpretation 8. Ethical Principles in Research 9. Scientific Writing and Communication 10. Technology and Tools for Research 11. Critical Thinking and Problem-Solving in Research 12. Peer Review and Collaborative Research 13. Applying Research to Real-World Problems 14. Capstone Project: Designing and Presenting a Research Proposal

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**Implementation Framework** • **Phase 1**: Foundational knowledge (lectures, tool training). • **Phase 2**: Application (workshops, micro-projects). • **Phase 3**: Synthesis (capstone projects, peer reviews). This approach ensures students gain both competency in scientific research methods and the critical, ethical, and collaborative mindset needed for impactful inquiry.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2.2

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**50**		

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)
المنهاج الأسبوعي النظري

	Material Covered
Week 1	**Introduction to Scientific Research:**Defining research, its purpose, and its role in advancing knowledge.
Week 2	**The Scientific Method and Inquiry Process:**Steps of systematic investigation: observation, hypothesis, experimentation, analysis, and conclusion.
Week 3	**Formulating Research Questions and Hypotheses:**Techniques for crafting focused, testable questions and hypotheses.
Week 4	**Research Design and Methodology:**Overview of qualitative, quantitative, experimental, and observational approaches.
Week 5	**Literature Review and Critical Analysis:**Strategies for sourcing, evaluating, and synthesizing existing scholarly work.
Week 6	**Data Collection Techniques:**Tools for gathering data: surveys, experiments, interviews, and observations.

Week 7	**Data Analysis and Interpretation:**Basic statistical methods and thematic analysis for qualitative and quantitative data.
Week 8	**Ethical Principles in Research:**Addressing plagiarism, informed consent, confidentiality, and research integrity.
Week 9	**Scientific Writing and Communication:**Structuring reports, abstracts, and papers; visualizing data (graphs, charts).
Week 10	**Technology and Tools for Research:**Using reference managers, data analysis software, and digital collaboration platforms.
Week 11	**Critical Thinking and Problem-Solving in Research:**Evaluating evidence, identifying biases, and addressing research challenges.
Week 12	**Peer Review and Collaborative Research**Engaging in constructive feedback and teamwork for quality assurance.
Week 13	**Applying Research to Real-World Problems** Translating findings into practical solutions for societal or technical issues.
Week 14	**Capstone Project: Designing:**Integrating knowledge to develop, execute.
Week 15	**Presenting a Research Proposal:** present a mini-research study.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	
Week 8	
Week 9	
Week10	
Week 11	
Week 12	
Week 13	
Week 14	

Week 15	

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	• Kothari, C. R., and Gaurav Garg. Research Methodology: Methods and Techniques. New Delhi: New Age International Publishers, 2019. Print • Kumar, Ranjit. Research Methodology: A Step by Step Guide for Beginners. Noida: Pearson India Education Services Pvt Ltd, 2007. Print.	Yes Yes
Recommended Texts	Stages in Scientific Research Process Presented by Ganesh Dive	No
Websites	• https://www.amnh.org/explore/videos/the-scientific-process • https://www.sciencebuddies.org/science-fair-projects/science-fair/steps-of-the-scientific-method • https://study.com/learn/lesson/scientific-method-example-steps.html • https://scientific-publishing.webshop.elsevier.com/manuscript-preparation/how-to-write-your-references-quickly-and-easily/	

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

Module Information معلومات المادة الدراسية					
Module Title	**Comparative Anatomy**			**Module Delivery**	
Module Type	**Core**			☒Theory ☒ Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	**Bio1-48039**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	4		**Semester of Delivery**	8	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. Fatima Kasim Mohammad		**e-mail**	fatsbio25@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Ilham Abd Allah Ali Al-Saleem		**e-mail**	ilhsbio41@uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	02/06/2023		**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 Objectives أهداف المادة الدراسية	This study aims 1. Communicating anatomical information to students in the different types of vertebrates. 2. compare its members . 3. keep pace with the development that is happening in the world
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**1. The students could able recognize the classification of chordate animals** **2. students could able to recognize the characteristics of chordata** **3. They can distinguish different parts in different chordate animals with their functions.** **4. Student can understand the comparative anatomy of vertebrates.** **5. Help the student to be professional biologist.** **6. Encourage the student to develop his skills in comparative anatomy.**
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Introduction & historical overview, of chordates & vertebrates. taxonomy of chordates & vertebrates. Evolutionary relationship, protochordates. Protochordates. [*10* hrs] , Comparative anatomy of integument of chordates, skin derivatives1. Comparative anatomy of integument of chordates, skin derivatives2. Comparative anatomy of integument of chordates, skin derivatives3. [*8* hrs] Comparative anatomy of integument of chordates, skin derivatives4. Comparative anatomy of digestive. Comparative anatomy respiratory system. Comparative anatomy of excretory system & types of kidneys1.[*10* hrs] Comparative anatomy of excretory system & types of kidneys2. Comparative anatomy of skeletal system.Comparative anatomy of nervous system. sense organs. [8 hrs] Revision problem classes [3 hrs] Part B – Practical labs The characteristics of chordate.subphylums of chordate,urochordata ،subphylums,hemichordate. r subphylums cephalochordate. The classes of fishes agnatha. chondricthyes. Osteocthyes. the beginning of tetrapoda. [18 hrs] The characteristics of class amphibian, and the orders of it1. The characteristics of class amphibian, and the orders of it2. The characteristics of class Reptilia1. The characteristics of class Reptilia2. The characteristics of class Aves. The characteristics of class Mammlia1. The characteristics of class Mammlia2. [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents . Various techniques were used such as. Data show , Microscope, Posters Students do study the following fields: The characteristics of chordate animals.They understand the four subphylums of chordate. The classifications and characteristics of Psices.They study the subphylum of vertebrata. Taxonomy of chordates. Evolutionary relationship. Protochordates. Comparative anatomy of all systems in the vertebrate body. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

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

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction & historical overview, of chordates & vertebrates
Week 2	taxonomy of chordates & vertebrates
Week 3	Evolutionary relationship, protochordates
Week 4	Protochordates
Week 5	Comparative anatomy of integument of chordates, skin derivatives1.
Week 6	Comparative anatomy of integument of chordates, skin derivatives2.
Week 7	Comparative anatomy of integument of chordates, skin derivatives3.
Week 8	Comparative anatomy of integument of chordates, skin derivatives4.
Week 9	Comparative anatomy of digestive .
Week 10	Comparative anatomy respiratory system.
Week 11	Comparative anatomy of excretory system & types of kidneys1.
Week 12	Comparative anatomy of excretory system & types of kidneys2.
Week 13	Comparative anatomy of skeletal system.
Week 14	Comparative anatomy of nervous system.
Week 15	sense organs.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: The characteristics of chordate.
Week 2	Lab 2: subphylums of chordate,urochordata,.
Week 3	Lab 3: subphylums,hemichordate.
Week 4	Lab 4: r subphylums cephalochordate.
Week 5	Lab 5: The classes of fishes agnatha .
Week 6	Lab 6: .chondricthyes.
Week 7	Lab 7: Osteocthyes .
Week 8	Lab 8: the beginning of tetrapoda.
Week 9	Lab9: The characteristics of class amphibian, and the orders of it1.

Week10	Lab 10: The characteristics of class amphibian, and the orders of it2.
Week 11	Lab 11: The characteristics of class Reptilia1.
Week 12	Lab 12: The characteristics of class Reptilia2.
Week 13	Lab 13: The characteristics of class Aves.
Week 14	Lab 14: The characteristics of class Mammlia1.
Week 15	Lab 15: The characteristics of class Mammlia2.

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Vertebrates: Comparative Anatomy, Function, Evolution 8th Edition . by Kenneth Kardong.1998**	Yes
Recommended Texts	**Comparative Anatomy: Manual of Vertebrate Dissection, 3e 3rd Edition . by Dale W. Fishbeck (Author), Aurora M. Sebastiani. 2015**	No
Websites	https://byjus.com/biology/comparative-anatomy/ https://www.inspiritvr.com/general-bio/evolution/comparative-anatomy-study-guide	

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group	**A -** Excellent	امتياز	90 - 100	Outstanding Performance

(50 - 100)	**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

Module Information معلومات المادة الدراسية					
Module Title	**Immunology**			**Module Delivery**	
Module Type	**Core**			☒Theory ☒Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	**Bio1-48041**				
ECTS Credits	4				
SWL (hr/sem)	**100**				
Module Level		3	**Semester of Delivery**		8
Administering Department		Bio	**College**	Sci	
Module Leader	Dr. Hiyam Adil Al-Taii		**e-mail**	hiyamaltaii@uomosul.edu.iq	
Module Leader's Acad. Title		Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	Dr. Rojan Ghanim Mohammed		**e-mail**	**rojsbio57@uomosul.edu.iq**	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		1/10/2024	**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 Objectives أهداف المادة الدراسية	This study aims 1. The student understood the basic concepts of immunology, the components of the immune system, its organs, cells, molecules and functions. 2. Learn about the mechanisms of immune response reactions, how they are regulated, and classify immune diseases 3. Learn about the importance of antibodies, their structure, types of antibodies, and the mechanism of interaction between antigens and antibodies. 4. Helping the student to understand how the immune system works in the normal physiological state and in the case of disease 5. Knowledge and understanding of clinical disorders associated with autoimmune diseases 6. The student understands the basic concepts of immunology, the components of the immune system, its organs, cells, molecules and functions 7. Learn about the mechanisms of immune response reactions, how they are regulated, and classify immune diseases 8. Learn about the importance of antibodies, their structure, the diversity of antibodies, and the mechanism of interaction between antigens and antibodies 9. Helping the student to understand how the immune system works in the normal physiological state and in the case of disease 10. Understanding the immunological basis for rejection of transplanted organs and the medical examinations required before organ transplantation 11. Knowledge and understanding of clinical disorders associated with autoimmune diseases 12. Learn about the mechanisms of immune response reactions, how they are regulated, and classify immune diseases
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand how the immune system is used in prevention and treatment. 2. Learn about some laboratory immunological tests that are used in practice to detect the interactions of antibodies with antigens. 3. Familiarity with the importance of vaccinations. 4. The student's ability to distinguish between normal and abnormal immune response mechanisms. 5. The student realizes the impact of the surrounding environment, psychological state, and advanced age on the immune system and the increase in the incidence of cancerous tumors. 6. Introducing the importance of the basics of immunology and its relationship to other branches of science. 7. Study of the structure and anatomical description of the immune system, primary lymphoid tissue, secondary lymphoid tissue, bone marrow stem cells.

Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Introduction in Immunology. Innate immune response-1 . Complement ,phagocytosis. Primary Lymphoid organ. Secondary Lymphoid organ .Cell-1- .Cell-2-.[*14*hrs] Cell-mediated immune response. T-Cell .Immunoglobulins-1 .Immunoglobulins-2.[*14*hrs] Antigen. Immunogen..MHC-I .MHC-II. Immunodiseases. [18 hrs] Revision problem classes [3 hrs] Part B – Practical labs CBC test. Differential WBC. Phagocytosis. Complement. Injection of Lab animals. Agglutination and perception reaction. [18 hrs] ELISA-1. ELISA -2. Immunofluorescence-1. - Immunofluorescence-2- E-rosette-1. E-rosette-2. Hypersensitivity. Lymphoblast transformation test. Flow cytometry. [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents . Various techniques were used such as. Data show , Microscope, Posters, serological methods and immunological kits. Students' behavior is highly professional in class. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	22	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Introduction in Immunology
Week 2	Innate immune response-1 Complement ,phagocytosis
Week 3	Primary Lymphoid organ .
Week 4	Secondary Lymphoid organ.
Week 5	Cell-1-
Week 6	Cell-2-
Week 7	Cell-mediated immune response
Week 8	T-Cell
Week 9	Immunoglobulins-1.
Week 10	Immunoglobulins-2.
Week 11	Antigen .
Week 12	Immunogen.
Week 13	MHC-I.
Week 14	MHC-II.
Week 15	Immunodiseases.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: CBC test
Week 2	Lab 2: Differential WBC
Week 3	Lab 3: Phagocytosis.
Week 4	Lab 4:Complement.
Week 5	Lab 5: Injection of Lab animals.
Week 6	Lab 6:Agglutination and perception reaction
Week 7	Lab 7: ELISA-1.
Week 8	Lab 8: ELISA -2.
Week 9	Lab9: Immunofluorescence-1- .
Week10	Lab 10: Immunofluorescence-2-
Week 11	Lab 11: E-rosette-1.
Week 12	Lab 12: E-rosette-2.
Week 13	Lab 13: Hypersensitivity.
Week 14	Lab 14: Lymphoblast transformation test .
Week 15	Lab 15: Flow cytometry.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Kuby Immunology Eighth Edition(2019 . by Jenni Punt (Author), Sharon Stranford (Author), Patricia Jones (Author), Judy Owen (Author). Immunology: A Short Course. John Wiley & Sons, Inc, New York, NY. 6th edition, 2009. Chapters 7, 9, 10, 11. Geha and Notarangelo. Case Studies in Immunology. Garland Publishing, New York, NY. 6th edition, 2012. Case 47. Toxic Shock Syndrome. Supplemental Reading for Cancer Immunology: Coico and Sunshine, 2009. Chapter 19	Yes Yes
Recommended Texts	Immunology: A Short Course. John Wiley & Sons, Inc, New York, NY. 6th edition, 2009. Chapter 13; Geha and Notarangelo. Case Studies in Immunology. Garland Publishing, New York, NY. 6th edition, 2012.	No
Websites	http://www.uth.tmc.edu/pathology/medic/immunology/Immuno/Biologybt.html http://www.uth.tmc.edu/pathology/medic/immunology/Immuno/antibodies.html	

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

Module Information معلومات المادة الدراسية					
Module Title	**Animal Physiology1**			**Module Delivery**	
Module Type	**Core**			☒Theory ☒ Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	**Bio1-47031**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	3		**Semester of Delivery**	7	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. Muntaha Mahmood		**e-mail**	muntsbio17@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Abeer Attaala Aeed		**e-mail**	**abesbio53@uomosul.edu.iq**	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**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 Objectives أهداف المادة الدراسية	This study aims 1. The student's comprehension of the concept of the course and his ability to distinguish between it and other sciences. 2. Addressing a comprehensive description of the various body systems, with a focus on ruminant field animals and poultry. 3. Studying the vital processes that occur in the animal's body that transform the nutrients that the animal eats and turn them into animal products or other secondary waste. 4. Basic and physiology of growth and reproduction. 5. Keep up with the development that is happening in the world
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. The students understand different physiological mechanisms in the body. 2. Help the students to master the interaction and relationships between body systems. 3. The development of student's skills for going into relationship between the physiological and pathological disorders. 4. The students understand mode of action each physiological test. 5. Help the students to master the procedure of each physiological test. 6. The development of student's skills for going into the laboratory work experience as specialist who has an excellent background on all physiological tests and their relationship to disease and not as technician operating advice.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Introduction to Physiology. Cell physiology. The mechanisms of transports across the cell membrane. Phagocytosis mechanism. Pinocytosis mechanism. [*10* hrs] Blood physiology. Physical Characteristics of blood. Plasma, Erythrocytes, Erythropoiesis. erythrocyte disorders. Types of anemia. Leukocytes. Functions of all types of Leukocytes. Platelets, Hemostasis mechanism, Fibrinolysis.[*18*hrs] Physiology of Digestion system. Functions of the Digestive System. Nervous Regulation of the Digestive System. Function of Stomach. Regulation of Gastric Secretion. Pancreas. Gall Bladder. Small Intestine. Large intestine [18hrs] Revision problem classes [3 hrs] Part B – Practical labs General safety instructions in the laboratory. Introduction Circulatory system. Fragility test 1. Fragility test 2. Total Red Blood Cell count. differential count. Estimation Hemoglobin. [18 hrs] PCV test. Platelets count. : ESR test. Bleeding time Test. Blood pressure. Physiological and pathological variation of Blood pressure. Blood groups. Respiratory test.[18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents . Various techniques were used such as. Data show , Microscope, Posters . Students do study the following fields: An introduction to the study of Physiology of the body. Definition of body systems and understands how this system work under normal conditions. Definition of the techniques uses to estimation of body parameters. Study the disorders of this systems physiology and study the diseases results from disorders in homeostats. The relationships between the different body systems. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

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

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction to Physiology.
Week 2	Cell physiology.
Week 3	The mechanisms of transports across the cell membrane.
Week 4	Phagocytosis mechanism. Pinocytosis mechanism.
Week 5	Blood physiology.
Week 6	Physical Characteristics of blood. Plasma, Erythrocytes, Erythropoiesis.
Week 7	erythrocyte disorders.
Week 8	Types of anemia. Leukocytes.
Week 9	Functions of all types of Leukocytes.
Week 10	Platelets, Hemostasis mechanism, Fibrinolysis.
Week 11	Physiology of Digestion system.
Week 12	Functions of the Digestive System.
Week 13	Nervous Regulation of the Digestive System. Function of Stomach. Regulation of Gastric Secretion.
Week 14	Pancreas. Gall Bladder.
Week 15	Small Intestine. Large intestine.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: General safety instructions in the laboratory.
Week 2	Lab 2: Introduction Circulatory system.
Week 3	Lab 3: Fragility test 1.
Week 4	Lab 4: Fragility test 2.
Week 5	Lab 5: Total Red Blood Cell count.
Week 6	Lab 6: differential count.
Week 7	Lab 7: Estimation Hemoglobin.
Week 8	Lab 8: PCV test.
Week 9	Lab9: Platelets count.
Week10	Lab 10: ESR test.
Week 11	Lab 11: Bleeding time Test.
Week 12	Lab 12: Blood pressure.
Week 13	Lab 13: Physiological and pathological variation of Blood pressure.
Week 14	Lab 14: Blood groups.
Week 15	Lab 15: Respiratory test.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Guyton, A. and Hall, J.E. (2016). "Text book of physiology". 11th ed. Elsevier Saunders. China.** **Barrett, K.; brooks, H.; Boitano, S. and Barman, S. (2010). "Ganong's eview of Medical Physiology". 23 th edition. McGraw Hill Companies. New York**	Yes Yes
Recommended Texts	**Ghia, CL. (2013). A Textbook of Practical Physiology. Jaypee Brothers Medical Publishers (P) Ltd.; 8th edition.**	No
Websites	https://www.nature.com/subjects/animal-physiology https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/animal-physiology	

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

Module Information معلومات المادة الدراسية					
Module Title	**Plant Physiology1**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Bio1-47032**				
ECTS Credits	5				
SWL (hr/sem)	**125**				
Module Level	3		**Semester of Delivery**	7	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. Nihal E. Al-Taee		**e-mail**	Nehsbio34@uomosul.edu.iq	
Module Leader's Acad. Title	Assit. Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Nihal E. Al-Taee Dr. Wasan Salih Hussain		**e-mail**	Nehsbio34@uomosul.edu.iq **wassbio54@uomosul.edu.iq**	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**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 Objectives أهداف المادة الدراسية	This study aims 1. Definition of physiology. 2. Studying plant cell structure and function of different cellular organelles. 3. Study of water relations. 4. Study the importance of mineral elements for plants. 5. Brief study of structural and catabolic metabolism.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. He prepares samples of plant tissue to study the plant cell under a microscope. 2. Study the properties of water. 3. And how to prepare solutions and study the phenomenon of diffusion, osmosis and plasma. 4. Prepare experiments to study how water and nutrients move. 5. Discusses how each plant organ performs its different functions. 6. The relationship of each part of the plant to the other. 7. Explain the different ways of absorbing and transporting water in plants. 8. And how plants sweat differentiate between plant needs of mineral elements. 9. That the student be able to understand the different parts of the plant body and their relationship to the concept of physiology. 10. Realizing the importance of water and distinguishing between the mechanism of uptake, transport and loss of water from plants. 11. The ability to understand the mechanism of absorption of nutrients.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures I Introduction to plant physiology. Solutions Types. ، Solutions : properties. Solutions : Preparation. Plant Water relations. properties of water and its importance. [*10* hrs] Diffusion, define,factors affecting on diffusion, importance. Imbibition, Conditions necessary for imbibition, Factors affecting on imbibition,Impotance of imbibition [*8* hrs] Osmosis ,Conditions in Osmosis Water potential. components of water potential. Permeability,types of membrans, General rules of permeability.Impotance o permeability Water potential and their components. [*10* hrs] Tranclocation, Pathway of water transport. Transpiration(types,mechanism ، theory, Guttation, Bleeding, [8 hrs] Revision problem classes [3 hrs] Part B – Practical labs

	Study of Osmosis. Permeability. Permeability, define,factors affecting, rules for permeability, importance Osmosis, Conditions in Osmosis Water potential, components of water potential. Ways of solutes entry and transport through the plant cells membranes,simple and Facilitated diffiusion, active transport . Transpiration.Types of transpiration Stomata, Structure of stomata, Number of Stomata (Stomatal Frequency). [18 hrs] Mechanism of transpiration, Stomatal movement, Role of transpiration. Phytohormones are chemical messengers that coordinate cellular activities. This lecture introduces the plant hormones (auxin, cytokinin, gibberellic acid, brassinosteroids, ethylene, abscisic acid, salicylic acid and jasmonic acid) through their roles, during the plants life, from seed-to-seed.Photosynthesis is the process by which plants use sunlight, water, and carbon dioxide to create oxygen and energy in the form of sugar. [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents .Students do study the following fields: Solution, Types(True,colloidal,suspension,Eumlsion) . Colloidal systems, properties, Buffer solution. Plant water relationship,properties of water,Diffusion,define,factors affecting on diffusion, importance . Imbibition, define,factors affecting, Conditions necessary for imbibition, importance . Permeability, define,factors affecting, rules for permeability, importance Osmosis, Conditions in Osmosis Water potential, components of water potential. Ways of solutes entry and transport through the plant cells membranes,simple and Facilitated diffiusion, active transport Relationship between plants and environment, Absorption of water and solutes by plants roots, Factors affecting water absorption by root . Water and minerals transport in plant(Translocation), Pathway of water transport Mechanisms (theory) of water and its solute transport, Root pressure, Transpiration pulls, Cohesion-Adhesion theory, Guttation, Bleeding . Transpiration.Types of transpiration Stomata, Structure of stomata, Number of Stomata (Stomatal Frequency). Mechanism of transpiration, Stomatal movement, Role of transpiration. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1

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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction to plant physiology
Week 2	Solutions Types, .
Week 3	Solutions : properties.
Week 4	Solutions : Preparation.
Week 5	Plant Water relations.
Week 6	properties of water and its importance.
Week 7	Diffusion, define,factors affecting on diffusion, importance **.**
Week 8	Imbibition, Conditions necessary for imbibition, Factors affecting on imbibition,Impotance of imbibition
Week 9	Osmosis ,Conditions in Osmosis Water potential.
Week 10	components of water potential.

Week 11	Permeability,types of membrans, General rules of permeability.Impotance of permeablity
Week 12	Water potential and their components.
Week 13	Tranclocation, Pathway of water transport.
Week 14	Transpiration(types,mechanism,
Week 15	theory, Guttation, Bleeding,

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Study of Osmosis part 1.
Week 2	Lab 2: Study of Osmosis part 2.
Week 3	Lab 3: Permeability part 1.
Week 4	Lab 4: Permeability part 2.
Week 5	Lab 5: Transpiration part 1.
Week 6	Lab 6: Transpiration part 2.
Week 7	Lab 7: Respiration part 1.
Week 8	Lab 8: Respiration part 2.
Week 9	Lab9: Dormancy part 1.
Week10	Lab 10: Dormancy part 2.
Week 11	Lab 11: Phytohormones part 1.
Week 12	Lab 12: Phytohormones part 2.
Week 13	Lab 13: Photosynthesis part 1.
Week 14	Lab 14: Photosynthesis part 2.
Week 15	Lab 15: Photosynthesis part 3.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**D**uca M.(2015) Plant Physiology Bhatla S.C.and Lal M.A.(2018) Plant Physiology,Development and Metabolism . Plant Physiology(2011). edited by Philip Stewart, Sabine Globig	Yes Yes

		Yes
Recommended Texts	**Practical Plant Physiology(2021)** Frederick Keeble, M. C. Rayner	Yes
Websites	https://academic.oup.com/plphys https://www.sciencedirect.com/topics/medicine-and-dentistry/plant-physiology	

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

Module Information معلومات المادة الدراسية					
Module Title	**Molecular Biology**			**Module Delivery**	
Module Type	**Core**			☒Theory ☒ Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	**Bio1-47035**				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	4		**Semester of Delivery**	7	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. Sarab Daoud Sulayman		**e-mail**	sarsbio14@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Sahar Luqman Dr. Sahira Adrees		**e-mail**	sahira.scp5@student.uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**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 Objectives أهداف المادة الدراسية	This study aims 1. Understand the principles of biology at the molecular level. 2. Identifying the molecular structure of nucleic acids, their replication and their role in building protein 3. Understanding methods of controlling the level of gene expression in living cells. 4. Developing the student's perceptions by giving him an idea of recent trends in molecular biology. 5. Learn about modern applications of molecular genetics in various fields of life 6. Realizing the great progress in molecular genetics and its impact on human life.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1.Help the students to understands the genetic material nature and how it can be duplicated and transferred to the following off spring 2. Develops the students own skills to deal with genetic material and the mechanisms of its extraction and diagnosis different damage 3. Encourage students to discuss various problems and possible disease that occurred due to specific DNA Damages. 4. The students learn what are the advantages of DNA and RNA extraction. 5. The students know the types of cell disruption and distinguish between these types. 6. The students can distinguish between molecular techniques and other technique.
Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following. <u>Part A – Theoretical lectures</u> Chemical structure**.** physical properties of Nucleic acids**.** DNA REPLICTION1**.** DNA REPLICTION2**.** Transcription of prokaryotic DNA1**.** Transcription of prokaryotic DNA2**.**[*10* hrs] , prokaryotic transcription**.** eukaryotic transcription**.** Translation in prokaryotics1**.** Translation in prokaryotics2**.**[*8* hrs] Main differences between pro and eukaryotic translation1**.** Main differences between pro and eukaryotic translation2**.** Pro and eukaryotic gene structure**.**[*10* hrs] Gene expression.1**.** Gene expression2. [8 hrs] Revision problem classes [3 hrs] <u>Part B – Practical labs</u> Introduction of information about laboratory safety**.**Introduction of cell disruption**.**DNA extraction **.**RNA extraction**.**Detection RNA and DNA.1**.**Detection RNA and DNA2**..**Estimation of DNA concentration and purity1**.**Estimation of DNA concentration and purity2**.** [18 hrs] PCR technique1**.**PCR technique2**.**Gel electrophoresis1**.**Gel electrophoresis2**.**Molecular techniques.1**.**Molecular techniques2**.**Molecular techniques3. [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents . Various techniques were used such as. Data show , Microscope, Posters Students do study the following fields: DNA Chemical structure and physical properties. Eukaryotic and Prokaryotic chromosome organization and packaging. Prokaryotic replication of DNA and eukaryotic differences. Protein synthesis , Transcription and Translation. Prokaryotic and eukaryotic gene structure.. Prokaryotic and eukaryotic gene expression (LAC Operon). This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Chemical structure .
Week 2	physical properties of Nucleic acids.
Week 3	DNA REPLICTION1.
Week 4	DNA REPLICTION2.
Week 5	Transcription of prokaryotic DNA1.
Week 6	Transcription of prokaryotic DNA2.
Week 7	prokaryotic transcription.
Week 8	eukaryotic transcription.
Week 9	Translation in prokaryotics1.
Week 10	Translation in prokaryotics2.
Week 11	Main differences between pro and eukaryotic translation1.
Week 12	Main differences between pro and eukaryotic translation2.
Week 13	Pro and eukaryotic gene structure.
Week 14	Gene expression.1.
Week 15	Gene expression2.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction of information about laboratory safety.
Week 2	Lab 2: Introduction of cell disruption.
Week 3	Lab 3: DNA extraction.
Week 4	Lab 4: RNA extraction.
Week 5	Lab 5: Detection RNA and DNA.1.
Week 6	Lab 6: Detection RNA and DNA2..
Week 7	Lab 7: Estimation of DNA concentration and purity1.
Week 8	Lab 8:. Estimation of DNA concentration and purity2.

Week 9	Lab9: PCR technique1.
Week10	Lab 10: PCR technique2.
Week 11	Lab 11: Gel electrophoresis1.
Week 12	Lab 12: Gel electrophoresis2.
Week 13	Lab 13: Molecular techniques.1.
Week 14	Lab 14: Molecular techniques2.
Week 15	Lab 15: Molecular techniques3.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**1- Vennison, S. J.(2009). Laboratory Manual for Genetic Engineering.** **2- O'Grady,S. et.al., (2011).Molecular Biology Techniques Laboratory Manual..** **3- Harish, P.(1992).Association for biology Education.** **4-Nucleic acid detection, ultrasensitive fluorescent, gel stains and quantitation reagents.** **5- Amin-ul Mannan, M. ; Sharma, S. and Ganesan , K. (2009). Total RNA isolation from recalcitrant yeast cells. Analytical Biochemistry, 389: 77-79.**	Yes No Yes NO Yes
Recommended Texts	**6- Maniatis, T.; Fritsch, E.F. and Sambrook, J. (1982). Molecular Cloning: A Laboratory Manual, Cold Spring Harbor Laboratory, Cold Springs Harbor, NY.**	Yes
Websites	www.zoo.utoronto.ca/able https:// www.austince.edu	

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

Module Information معلومات المادة الدراسية					
Module Title	**Research Methodology**			**Module Delivery**	
Module Type	**Core**			☒Theory ☒ Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	**Bio1-47036**				
ECTS Credits	2				
SWL (hr/sem)	**50**				
Module Level		4	**Semester of Delivery**		7
Administering Department		Bio	**College**	Sci	
Module Leader	Dr. Rojan Ghanim		**e-mail**	rojsbio57@uomosul.edu.iq	
Module Leader's Acad. Title		Assist. Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor			**e-mail**		
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		1/10/2024	**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 Objectives أهداف المادة الدراسية	**This study aims** The objectives of the basics of scientific research encompass a range of foundational goals aimed at equipping individuals with the skills, knowledge, and mindset necessary for effective inquiry. Here's an organized breakdown: 1. **Understand Scientific Inquiry**: Grasp the systematic process of asking questions, investigating phenomena, and refining knowledge through structured methods. 2. **Develop Critical Thinking**: Cultivate the ability to analyze information, evaluate evidence, and reason logically to draw objective conclusions. 3. **Formulate Hypotheses/Questions**: Learn to craft testable hypotheses and research questions that guide investigations. 4. **Master Methodologies**: Gain proficiency in qualitative, quantitative, experimental, and observational research designs. 5. **Acquire Data Skills**: Learn techniques for collecting, organizing, and analyzing data using appropriate statistical or thematic tools. 6. **Uphold Ethics**: Adhere to integrity, transparency, and responsibility in research, including informed consent and data privacy. 7. **Communicate Findings**: Effectively share results through academic writing, presentations, and visualizations for peer and public engagement. 8. **Enhance Problem-Solving**: Apply structured approaches to address complex issues and propose evidence-based solutions. 9. **Expand Knowledge**: Contribute new insights to existing literature, driving intellectual and practical advancements. 10. **Support Evidence-Based Decisions**: Provide reliable data to inform policies, practices, and innovations across fields. 11. **Foster Innovation**: Stimulate technological and conceptual breakthroughs by exploring uncharted territories. 12. **Encourage Collaboration**: Promote teamwork and peer review to validate research quality and foster interdisciplinary progress. 13. **Nurture Curiosity**: Inspire a passion for discovery and openness to exploring novel ideas and challenges. 14. **Critique Literature**: Evaluate existing studies to identify gaps, biases, and opportunities for further research. 15. **Bridge Theory and Practice**: Apply theoretical frameworks to real-world problems, ensuring research relevance and impact. 16. **Promote Lifelong Learning**: Embrace continuous skill development and adaptability in an evolving scientific landscape.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**Module Learning Outcomes of *Basics of Scientific Research*** By the end of this module, learners will be able to: 1. **Demonstrate understanding of the scientific method** Explain the systematic steps of scientific inquiry (observation,

hypothesis, experimentation, analysis, conclusion).

2. **Formulate research questions and hypotheses**
   Design clear, testable, and focused research questions or hypotheses aligned with a defined problem or gap in knowledge.

3. **Select appropriate research methodologies**
   Compare qualitative, quantitative, experimental, and observational methods and choose the best fit for a research objective.

4. **Design a research proposal**
   Outline a structured research plan, including objectives, methodology, tools, timelines, and ethical considerations.

5. **Apply data collection and analysis techniques**
   Use tools (e.g., surveys, experiments, interviews) to gather data and apply basic statistical or thematic analysis to interpret results.

6. **Critically evaluate research literature**
   Analyze existing studies to identify strengths, weaknesses, gaps, and biases, and contextualize findings within broader scholarship.

7. **Adhere to ethical standards in research**
   Recognize ethical dilemmas (e.g., plagiarism, confidentiality, consent) and apply ethical guidelines to research design and execution.

8. **Communicate research findings effectively**
   Present results through academic writing, visual aids (charts, graphs), and oral presentations tailored to diverse audiences.

9. **Apply critical thinking to problem-solving**
   Evaluate evidence, identify logical fallacies, and propose evidence-based solutions to real-world or theoretical problems.

10. **Collaborate in peer-review processes**
    Provide constructive feedback on others' work and incorporate peer insights to refine research quality and validity.

11. **Use technology for research efficiency**
    Leverage digital tools (e.g., reference managers, data analysis software) to enhance research productivity and accuracy.

12. **Connect theory to practice**
    Translate theoretical concepts into practical research applications that address societal, environmental, or technical challenges.

13. **Develop a growth mindset for lifelong learning**

	Reflect on research experiences to identify areas for improvement and commit to continuous skill development in scientific inquiry.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> 1. Introduction to Scientific Research 2. The Scientific Method and Inquiry Process 3. Formulating Research Questions and Hypotheses 4. Research Design and Methodology 5. Literature Review and Critical Analysis 6. Data Collection Techniques 7. Data Analysis and Interpretation 8. Ethical Principles in Research 9. Scientific Writing and Communication 10. Technology and Tools for Research 11. Critical Thinking and Problem-Solving in Research 12. Peer Review and Collaborative Research 13. Applying Research to Real-World Problems 14. Capstone Project: Designing and Presenting a Research Proposal

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**Implementation Framework** • **Phase 1**: Foundational knowledge (lectures, tool training). • **Phase 2**: Application (workshops, micro-projects). • **Phase 3**: Synthesis (capstone projects, peer reviews). This approach ensures students gain both competency in scientific research methods and the critical, ethical, and collaborative mindset needed for impactful inquiry.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2.2

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**50**		

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)
المنهاج الأسبوعي النظري

	Material Covered
Week 1	**Introduction to Scientific Research:**Defining research, its purpose, and its role in advancing knowledge.
Week 2	**The Scientific Method and Inquiry Process:**Steps of systematic investigation: observation, hypothesis, experimentation, analysis, and conclusion.
Week 3	**Formulating Research Questions and Hypotheses:**Techniques for crafting focused, testable questions and hypotheses.
Week 4	**Research Design and Methodology:**Overview of qualitative, quantitative, experimental, and observational approaches.
Week 5	**Literature Review and Critical Analysis:**Strategies for sourcing, evaluating, and synthesizing existing scholarly work.
Week 6	**Data Collection Techniques:**Tools for gathering data: surveys, experiments, interviews, and observations.

Week 7	**Data Analysis and Interpretation:**Basic statistical methods and thematic analysis for qualitative and quantitative data.
Week 8	**Ethical Principles in Research:**Addressing plagiarism, informed consent, confidentiality, and research integrity.
Week 9	**Scientific Writing and Communication:**Structuring reports, abstracts, and papers; visualizing data (graphs, charts).
Week 10	**Technology and Tools for Research:**Using reference managers, data analysis software, and digital collaboration platforms.
Week 11	**Critical Thinking and Problem-Solving in Research:**Evaluating evidence, identifying biases, and addressing research challenges.
Week 12	**Peer Review and Collaborative Research**Engaging in constructive feedback and teamwork for quality assurance.
Week 13	**Applying Research to Real-World Problems** Translating findings into practical solutions for societal or technical issues.
Week 14	**Capstone Project: Designing:**Integrating knowledge to develop, execute.
Week 15	**Presenting a Research Proposal:** present a mini-research study.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	
Week 8	
Week 9	
Week10	
Week 11	
Week 12	
Week 13	
Week 14	

Week 15	

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	• Kothari, C. R., and Gaurav Garg. Research Methodology: Methods and Techniques. New Delhi: New Age International Publishers, 2019. Print • Kumar, Ranjit. Research Methodology: A Step by Step Guide for Beginners. Noida: Pearson India Education Services Pvt Ltd, 2007. Print.	Yes Yes
Recommended Texts	Stages in Scientific Research Process Presented by Ganesh Dive	No
Websites	• https://www.amnh.org/explore/videos/the-scientific-process • https://www.sciencebuddies.org/science-fair-projects/science-fair/steps-of-the-scientific-method • https://study.com/learn/lesson/scientific-method-example-steps.html • https://scientific-publishing.webshop.elsevier.com/manuscript-preparation/how-to-write-your-references-quickly-and-easily/	

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

Module Information معلومات المادة الدراسية					
Module Title	**Comparative Anatomy**			**Module Delivery**	
Module Type	**Core**			☒Theory ☒ Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	**Bio1-48039**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	4		**Semester of Delivery**	8	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. Fatima Kasim Mohammad		**e-mail**	fatsbio25@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Ilham Abd Allah Ali Al-Saleem		**e-mail**	ilhsbio41@uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	02/06/2023		**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 Objectives أهداف المادة الدراسية	This study aims 1. Communicating anatomical information to students in the different types of vertebrates. 2. compare its members . 3. keep pace with the development that is happening in the world
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**1. The students could able recognize the classification of chordate animals** **2. students could able to recognize the characteristics of chordata** **3. They can distinguish different parts in different chordate animals with their functions.** **4. Student can understand the comparative anatomy of vertebrates.** **5. Help the student to be professional biologist.** **6. Encourage the student to develop his skills in comparative anatomy.**
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Introduction & historical overview, of chordates & vertebrates. taxonomy of chordates & vertebrates. Evolutionary relationship, protochordates. Protochordates. [*10* hrs] , Comparative anatomy of integument of chordates, skin derivatives1. Comparative anatomy of integument of chordates, skin derivatives2. Comparative anatomy of integument of chordates, skin derivatives3. [*8* hrs] Comparative anatomy of integument of chordates, skin derivatives4. Comparative anatomy of digestive. Comparative anatomy respiratory system. Comparative anatomy of excretory system & types of kidneys1.[*10* hrs] Comparative anatomy of excretory system & types of kidneys2. Comparative anatomy of skeletal system.Comparative anatomy of nervous system. sense organs. [8 hrs] Revision problem classes [3 hrs] Part B – Practical labs The characteristics of chordate.subphylums of chordate,urochordata ،subphylums,hemichordate. r subphylums cephalochordate. The classes of fishes agnatha. chondricthyes. Osteocthyes. the beginning of tetrapoda. [18 hrs] The characteristics of class amphibian, and the orders of it1. The characteristics of class amphibian, and the orders of it2. The characteristics of class Reptilia1. The characteristics of class Reptilia2. The characteristics of class Aves. The characteristics of class Mammlia1. The characteristics of class Mammlia2. [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents . Various techniques were used such as. Data show , Microscope, Posters Students do study the following fields: The characteristics of chordate animals.They understand the four subphylums of chordate. The classifications and characteristics of Psices.They study the subphylum of vertebrata. Taxonomy of chordates. Evolutionary relationship. Protochordates. Comparative anatomy of all systems in the vertebrate body. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

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

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction & historical overview, of chordates & vertebrates
Week 2	taxonomy of chordates & vertebrates
Week 3	Evolutionary relationship, protochordates
Week 4	Protochordates
Week 5	Comparative anatomy of integument of chordates, skin derivatives1.
Week 6	Comparative anatomy of integument of chordates, skin derivatives2.
Week 7	Comparative anatomy of integument of chordates, skin derivatives3.
Week 8	Comparative anatomy of integument of chordates, skin derivatives4.
Week 9	Comparative anatomy of digestive .
Week 10	Comparative anatomy respiratory system.
Week 11	Comparative anatomy of excretory system & types of kidneys1.
Week 12	Comparative anatomy of excretory system & types of kidneys2.
Week 13	Comparative anatomy of skeletal system.
Week 14	Comparative anatomy of nervous system.
Week 15	sense organs.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: The characteristics of chordate.
Week 2	Lab 2: subphylums of chordate,urochordata,.
Week 3	Lab 3: subphylums,hemichordate.
Week 4	Lab 4: r subphylums cephalochordate.
Week 5	Lab 5: The classes of fishes agnatha .
Week 6	Lab 6: .chondricthyes.
Week 7	Lab 7: Osteocthyes .
Week 8	Lab 8: the beginning of tetrapoda.
Week 9	Lab9: The characteristics of class amphibian, and the orders of it1.

Week10	Lab 10: The characteristics of class amphibian, and the orders of it2.
Week 11	Lab 11: The characteristics of class Reptilia1.
Week 12	Lab 12: The characteristics of class Reptilia2.
Week 13	Lab 13: The characteristics of class Aves.
Week 14	Lab 14: The characteristics of class Mammlia1.
Week 15	Lab 15: The characteristics of class Mammlia2.

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Vertebrates: Comparative Anatomy, Function, Evolution 8th Edition . by Kenneth Kardong.1998**	Yes
Recommended Texts	**Comparative Anatomy: Manual of Vertebrate Dissection, 3e 3rd Edition . by Dale W. Fishbeck (Author), Aurora M. Sebastiani. 2015**	No
Websites	https://byjus.com/biology/comparative-anatomy/ https://www.inspiritvr.com/general-bio/evolution/comparative-anatomy-study-guide	

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group	**A -** Excellent	امتياز	90 - 100	Outstanding Performance

(50 - 100)	**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

Module Information معلومات المادة الدراسية					
Module Title	**Immunology**			**Module Delivery**	
Module Type	**Core**			☒Theory ☒Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	**Bio1-48041**				
ECTS Credits	4				
SWL (hr/sem)	**100**				
Module Level		3	**Semester of Delivery**		8
Administering Department		Bio	**College**	Sci	
Module Leader	Dr. Hiyam Adil Al-Taii		**e-mail**	hiyamaltaii@uomosul.edu.iq	
Module Leader's Acad. Title		Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	Dr. Rojan Ghanim Mohammed		**e-mail**	**rojsbio57@uomosul.edu.iq**	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		1/10/2024	**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 Objectives أهداف المادة الدراسية	This study aims 1. The student understood the basic concepts of immunology, the components of the immune system, its organs, cells, molecules and functions. 2. Learn about the mechanisms of immune response reactions, how they are regulated, and classify immune diseases 3. Learn about the importance of antibodies, their structure, types of antibodies, and the mechanism of interaction between antigens and antibodies. 4. Helping the student to understand how the immune system works in the normal physiological state and in the case of disease 5. Knowledge and understanding of clinical disorders associated with autoimmune diseases 6. The student understands the basic concepts of immunology, the components of the immune system, its organs, cells, molecules and functions 7. Learn about the mechanisms of immune response reactions, how they are regulated, and classify immune diseases 8. Learn about the importance of antibodies, their structure, the diversity of antibodies, and the mechanism of interaction between antigens and antibodies 9. Helping the student to understand how the immune system works in the normal physiological state and in the case of disease 10. Understanding the immunological basis for rejection of transplanted organs and the medical examinations required before organ transplantation 11. Knowledge and understanding of clinical disorders associated with autoimmune diseases 12. Learn about the mechanisms of immune response reactions, how they are regulated, and classify immune diseases
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand how the immune system is used in prevention and treatment. 2. Learn about some laboratory immunological tests that are used in practice to detect the interactions of antibodies with antigens. 3. Familiarity with the importance of vaccinations. 4. The student's ability to distinguish between normal and abnormal immune response mechanisms. 5. The student realizes the impact of the surrounding environment, psychological state, and advanced age on the immune system and the increase in the incidence of cancerous tumors. 6. Introducing the importance of the basics of immunology and its relationship to other branches of science. 7. Study of the structure and anatomical description of the immune system, primary lymphoid tissue, secondary lymphoid tissue, bone marrow stem cells.

Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Introduction in Immunology. Innate immune response-1 . Complement ,phagocytosis. Primary Lymphoid organ. Secondary Lymphoid organ .Cell-1- .Cell-2-.[*14*hrs] Cell-mediated immune response. T-Cell .Immunoglobulins-1 .Immunoglobulins-2.[*14*hrs] Antigen. Immunogen..MHC-I .MHC-II. Immunodiseases. [18 hrs] Revision problem classes [3 hrs] Part B – Practical labs CBC test. Differential WBC. Phagocytosis. Complement. Injection of Lab animals. Agglutination and perception reaction. [18 hrs] ELISA-1. ELISA -2. Immunofluorescence-1. - Immunofluorescence-2- E-rosette-1. E-rosette-2. Hypersensitivity. Lymphoblast transformation test. Flow cytometry. [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents . Various techniques were used such as. Data show , Microscope, Posters, serological methods and immunological kits. Students' behavior is highly professional in class. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	22	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Introduction in Immunology
Week 2	Innate immune response-1 Complement ,phagocytosis
Week 3	Primary Lymphoid organ .
Week 4	Secondary Lymphoid organ.
Week 5	Cell-1-
Week 6	Cell-2-
Week 7	Cell-mediated immune response
Week 8	T-Cell
Week 9	Immunoglobulins-1.
Week 10	Immunoglobulins-2.
Week 11	Antigen .
Week 12	Immunogen.
Week 13	MHC-I.
Week 14	MHC-II.
Week 15	Immunodiseases.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: CBC test
Week 2	Lab 2: Differential WBC
Week 3	Lab 3: Phagocytosis.
Week 4	Lab 4:Complement.
Week 5	Lab 5: Injection of Lab animals.
Week 6	Lab 6:Agglutination and perception reaction
Week 7	Lab 7: ELISA-1.
Week 8	Lab 8: ELISA -2.
Week 9	Lab9: Immunofluorescence-1- .
Week10	Lab 10: Immunofluorescence-2-
Week 11	Lab 11: E-rosette-1.
Week 12	Lab 12: E-rosette-2.
Week 13	Lab 13: Hypersensitivity.
Week 14	Lab 14: Lymphoblast transformation test .
Week 15	Lab 15: Flow cytometry.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Kuby Immunology Eighth Edition(2019 . by Jenni Punt (Author), Sharon Stranford (Author), Patricia Jones (Author), Judy Owen (Author). Immunology: A Short Course. John Wiley & Sons, Inc, New York, NY. 6th edition, 2009. Chapters 7, 9, 10, 11. Geha and Notarangelo. Case Studies in Immunology. Garland Publishing, New York, NY. 6th edition, 2012. Case 47. Toxic Shock Syndrome. Supplemental Reading for Cancer Immunology: Coico and Sunshine, 2009. Chapter 19	Yes Yes
Recommended Texts	Immunology: A Short Course. John Wiley & Sons, Inc, New York, NY. 6th edition, 2009. Chapter 13; Geha and Notarangelo. Case Studies in Immunology. Garland Publishing, New York, NY. 6th edition, 2012.	No
Websites	http://www.uth.tmc.edu/pathology/medic/immunology/Immuno/Biologybt.html http://www.uth.tmc.edu/pathology/medic/immunology/Immuno/antibodies.html	

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

Module Information معلومات المادة الدراسية					
Module Title	**Immunology**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Bio2-47031**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	3		**Semester of Delivery**	7	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. Hiyam Adil Al-Taii		**e-mail**	hiyamaltaii@uomosul.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Rojan Ghanim Mohammed		**e-mail**	**rojsbio57@uomosul.edu.iq**	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**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 Objectives أهداف المادة الدراسية	This study aims 1. The student understood the basic concepts of immunology, the components of the immune system, its organs, cells, molecules and functions. 2. Learn about the mechanisms of immune response reactions, how they are regulated, and classify immune diseases 3. Learn about the importance of antibodies, their structure, types of antibodies, and the mechanism of interaction between antigens and antibodies. 4. Helping the student to understand how the immune system works in the normal physiological state and in the case of disease 5. Knowledge and understanding of clinical disorders associated with autoimmune diseases 6. The student understands the basic concepts of immunology, the components of the immune system, its organs, cells, molecules and functions 7. Learn about the mechanisms of immune response reactions, how they are regulated, and classify immune diseases 8. Learn about the importance of antibodies, their structure, the diversity of antibodies, and the mechanism of interaction between antigens and antibodies 9. Helping the student to understand how the immune system works in the normal physiological state and in the case of disease 10. Understanding the immunological basis for rejection of transplanted organs and the medical examinations required before organ transplantation 11. Knowledge and understanding of clinical disorders associated with autoimmune diseases 12. Learn about the mechanisms of immune response reactions, how they are regulated, and classify immune diseases
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand how the immune system is used in prevention and treatment. 2. Learn about some laboratory immunological tests that are used in practice to detect the interactions of antibodies with antigens. 3. Familiarity with the importance of vaccinations. 4. The student's ability to distinguish between normal and abnormal immune response mechanisms. 5. The student realizes the impact of the surrounding environment, psychological state, and advanced age on the immune system and the increase in the incidence of cancerous tumors. 6. Introducing the importance of the basics of immunology and its relationship to other branches of science. 7. Study of the structure and anatomical description of the immune system, primary lymphoid tissue, secondary lymphoid tissue, bone marrow stem cells.

Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Introduction in Immunology. Innate immune response-1 . Complement ,phagocytosis. Primary Lymphoid organ. Secondary Lymphoid organ .Cell-1- .Cell-2-.[*14*hrs] Cell-mediated immune response. T-Cell .Immunoglobulins-1 .Immunoglobulins-2.[*14*hrs] Antigen. Immunogen..MHC-I .MHC-II. Immunodiseases. [18 hrs] Revision problem classes [3 hrs] Part B – Practical labs CBC test. Differential WBC. Phagocytosis. Complement. Injection of Lab animals. Agglutination and perception reaction. [18 hrs] ELISA-1. ELISA -2. Immunofluorescence-1. - Immunofluorescence-2- E-rosette-1. E-rosette-2. Hypersensitivity. Lymphoblast transformation test. Flow cytometry. [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents . Various techniques were used such as. Data show , Microscope, Posters, serological methods and immunological kits. Students' behavior is highly professional in class. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Introduction in Immunology
Week 2	Innate immune response-1 Complement ,phagocytosis
Week 3	Primary Lymphoid organ .
Week 4	Secondary Lymphoid organ.
Week 5	Cell-1-
Week 6	Cell-2-
Week 7	Cell-mediated immune response
Week 8	T-Cell
Week 9	Immunoglobulins-1.
Week 10	Immunoglobulins-2.
Week 11	Antigen .
Week 12	Immunogen.
Week 13	MHC-I.
Week 14	MHC-II.
Week 15	Immunodiseases.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: CBC test
Week 2	Lab 2: Differential WBC
Week 3	Lab 3: Phagocytosis.
Week 4	Lab 4:Complement.
Week 5	Lab 5: Injection of Lab animals.
Week 6	Lab 6:Agglutination and perception reaction
Week 7	Lab 7: ELISA-1.
Week 8	Lab 8: ELISA -2.
Week 9	Lab9: Immunofluorescence-1- .
Week10	Lab 10: Immunofluorescence-2-
Week 11	Lab 11: E-rosette-1.
Week 12	Lab 12: E-rosette-2.
Week 13	Lab 13: Hypersensitivity.
Week 14	Lab 14: Lymphoblast transformation test .
Week 15	Lab 15: Flow cytometry.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Kuby Immunology Eighth Edition(2019 . by Jenni Punt (Author), Sharon Stranford (Author), Patricia Jones (Author), Judy Owen (Author). Immunology: A Short Course. John Wiley & Sons, Inc, New York, NY. 6th edition, 2009. Chapters 7, 9, 10, 11. Geha and Notarangelo. Case Studies in Immunology. Garland Publishing, New York, NY. 6th edition, 2012. Case 47. Toxic Shock Syndrome. Supplemental Reading for Cancer Immunology: Coico and Sunshine, 2009. Chapter 19	Yes Yes
Recommended Texts	Immunology: A Short Course. John Wiley & Sons, Inc, New York, NY. 6th edition, 2009. Chapter 13; Geha and Notarangelo. Case Studies in Immunology. Garland Publishing, New York, NY. 6th edition, 2012.	No
Websites	http://www.uth.tmc.edu/pathology/medic/immunology/Immuno/Biologybt.html http://www.uth.tmc.edu/pathology/medic/immunology/Immuno/antibodies.html	

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

Module Information معلومات المادة الدراسية					
Module Title	**Pathogenic Bacteriology**			**Module Delivery**	
Module Type	**Core**			☒Theory ☒ Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	**Bio2-47032**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	4		**Semester of Delivery**	7	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr.Muhsin Ayoub Essa		**e-mail**	Muhsbio13@oumosul.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Anmar Ahmad		**e-mail**	anmaraltaee1978@uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**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 Objectives أهداف المادة الدراسية	This study aims 1. Communicate pathogenic bacteria information to students 2. Know their types and the diseases they cause 3. and methods of diagnosis 4. and treat it 5. And keep pace with the development that is happening in the world
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**1. Every student be able to isolation and identification pathogenic bacteria from different clinical sites** **2. Every student have a knowledge about antibiotic sensitivity test for each bacteria.** 3. The field of specialization is teaching pathological bacteria in detail. 4- The students were able to understand the topic of pathogenic bacteria. 5- The student should know the terminology related to the subject of pathogenic bacteria 6- The student should understand the pathogenic mechanisms of bacteria and the types of bacteria that cause diseases 7- The student should understand methods of diagnosing pathogenic bacteria 8- The student should understand the methods of treating pathogenic bacteria
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Introduction. Pathogenesis of Bacterial Infection .The Staphylococci. The Streptococci, Enterococci, and Related.[*10* hrs] Enteric Gram-Negative Rods Enterobacteriaceae: E.coli. Salmonellae and Shigellae. Klebsiella and Proteus. Yersinia Species. [*8* hrs] Pseudomonads and Vibrios. campylobacter and Haemophilus Species. Brucellae and Bordetellae. Spore-Forming Gram-Positive Bacilli: Bacillus. Clostridium Species.[*10* hrs] Aerobic Non–Spore-Forming Gram-Positive Bacilli: Corynebacterium and Nocardia. Mycobacteria .Mycoplasmas and Cell Wall–Defective. Rickettsia and Related Genera. [8 hrs] Revision problem classes [3 hrs] Part B – Practical labs Introduction of biological lab. Safety.Methods for collection samples from patients1.. Methods for collection samples from patients2.Staphylococcus spp..Streptococcus spp.[18 hrs] Enterobacteriaceae 1.Enterobacteriaceae 2.Enterobacteriaceae 3.Enterobacteriaceae 4.Pseudomonas spp.Haemophilus spp.Bordetella spp.Lactobacillus spp.Vibrio spp.Clostridium. [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents . Various techniques were used such as. Data show , Microscope, Posters Students do study the following fields: Normal flora in human body and route of entry.Mechanisms of defense.Staphylococcus spp .Streptococcus spp .Enterobacteriaceae .Pseudomonas spp .Haemophilus spp .Bordetella spp .Lactobacillus sp Vibrio spp. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

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

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction .
Week 2	Pathogenesis of Bacterial Infection.
Week 3	The Staphylococci.
Week 4	The Streptococci, Enterococci, and Related.
Week 5	Enteric Gram-Negative Rods: Enterobacteriaceae: E.coli.
Week 6	Salmonellae and Shigellae .
Week 7	Klebsiella and Proteus.
Week 8	Yersinia Species.
Week 9	Pseudomonads and Vibrios.
Week 10	ampylobacter and Haemophilus Species.
Week 11	Brucellae and Bordetellae.
Week 12	Spore-Forming Gram-Positive Bacilli: Bacillus.
Week 13	Clostridium Species.
Week 14	Aerobic Non–Spore-Forming Gram-Positive Bacilli: Corynebacterium and Nocardia.
Week 15	Mycobacteria. Mycoplasmas and Cell Wall–Defective. Rickettsia and Related Genera.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction of biological lab. Safety.
Week 2	Lab 2: Methods for collection samples from patients1.
Week 3	Lab 3:. Methods for collection samples from patients2.
Week 4	Lab 4: Staphylococcus spp..
Week 5	Lab 5: Streptococcus spp.
Week 6	Lab 6: Enterobacteriaceae 1.
Week 7	Lab 7: Enterobacteriaceae 2.

Week 8	Lab 8:. Enterobacteriaceae 3.
Week 9	Lab9:. Enterobacteriaceae 4.
Week10	Lab 10: *Pseudomonas* spp.
Week 11	Lab 11: *Haemophilus* spp.
Week 12	Lab 12: *Bordetella* spp.
Week 13	Lab 13: *Lactobacillus* spp.
Week 14	Lab 14:*Vibrio* spp.
Week 15	Lab 15: Clostridium.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Tille, P., (2017). "Bailey & Scott's Diagnostic Microbiology" .14th ed. Elsevier . St. Louis, Missou.USA.** **Winn, W. C.; Allen.; S. D. J.; Janda, W. U.; Koneman, E. W.; Procop, G. W.; Schreckenbenberger, P. C. and Woods, G. L. (2006). " Koneman's Color Atlas and Text Book of Diagnostic Microbiology". 6th ed., Lippincott Williams and Wilkins, U.S.A.**	Yes Yes
Recommended Texts	**Riedel ,S., Morse, S.A., Mietzner, T., Miller ,S. (2019). Jawetz,Melnick & Adelberg s Medical Microbiology.28th ed. McGraw-Hill Companies, U.S.A.**	Yes
Websites	https://sc.uobaghdad.edu.iq/wp-content/uploads/sites/64/2021/09/%D8%A8%D9%83%D8%AA%D8%B1%D9%8A%D8%A7-%D9%85%D8%B1%D8%B6%D9%8A%D8%A9.pdf https://link.springer.com/chapter/10.1007/978-0-387-75113-9_1	

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

Module Information معلومات المادة الدراسية					
Module Title	**Food Microbiology**			**Module Delivery**	
Module Type	**Core**			☒Theory ☒ Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	**Bio2-47033**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	4		**Semester of Delivery**	7	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. Shakir Ghaze		**e-mail**	shksbio48@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Alla Almola DR. Safaq Tariq		**e-mail**	alasbio58@uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**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 Objectives أهداف المادة الدراسية	This study aims 1. Conveying information to students about microorganisms that grow in food, causing spoilage and spoilage. 2. growth conditions. 3. control the health problems caused by such as diseases and food poisoning.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- The field of specialization is teaching the growth of microorganisms in food and dairy and the spoilage it causes 2- Teaching the microbial populations responsible for food poisoning and developing and implementing procedures related to combating food poisoning infection. 3- Describe the controls that can be used to control microbial and enzymatic activity to reduce the rate of food spoilage and spoilage. 4- Assessment of the burden of food contamination and foodborne diseases 5- Describe how bacteria produce toxins and distinguish between exotoxins and endogenous toxins. 6- Students were able to understand the principles of food microbiology 7- Help students how to master the role of microorganisms in spoilage of food and study the environment factors effects on food spoilage 8- Encouraging students to develop their skills and Give students homework
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures [Introduction.Microbial spoilage of food..Factors affecting growand survival of microorganisms in foods. Intrinsic factors. *10* hrs] Extrinsic factors.Principles of food preservation.And Foo preservation by use of high temperatures. Food preservation b use of low temperature.[*8* hrs] And Preservative by food additives. Food preservation by radiation.. Spoilage of milk and milk products. Microbiology of fruits and vegetables. [*10* hrs] Microbiology of meat and meat products .Spoilage of meat and meat products. Bacterial causes of food poisoning. [8 hrs] Revision problem classes [3 hrs] Part B – Practical labs **H**istory of m.o. in food.Laboratory safety.Enumeration of microorganisms.Microbiological examination of milk.:Microbial examination of dairy product.Microbial examination of cheese.Detection of coliform.[18 hrs] Microbial examination of milk cattle have mastitis.Microbial examination of flour and sugar.Microbial examination of fruit juice.Microbial examination of meat.Microbial examination of frozen foods. Microbial examination of poultry meat and fish.Microbial examination of eggs. Microbial examination of eggs and Microbial examination of canned foods.[18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents . Various techniques were used such as. Data show , Microscope, Posters Students do study the following fields: Normal flora and pathogenic in food. Develop students' skills in terms of acquired and natural skills. The student was able to carry out the tasks of teaching pathogenic bacteria. The student was able to work in laboratories, hospitals and health institutions. The student was able to be aware of safety issues from diseases and their treatment in case of injury. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction.
Week 2	Microbial spoilage of food..
Week 3	Factors affecting growth and survival of microorganisms in foods.
Week 4	Intrinsic factors.
Week 5	Extrinsic factors.
Week 6	Principles of food preservation.
Week 7	And Food preservation by use of high temperatures.
Week 8	Food preservation by use of low temperature.
Week 9	And Preservative by food additives.
Week 10	Food preservation by radiation..
Week 11	Spoilage of milk and milk products.
Week 12	Microbiology of fruits and vegetables.
Week 13	Microbiology of meat and meat products.
Week 14	Spoilage of meat and meat products.
Week 15	Bacterial causes of food poisoning.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: History of m.o. in food.
Week 2	Lab 2: Laboratory safety.
Week 3	Lab 3: Enumeration of microorganisms.
Week 4	Lab 4: Microbiological examination of milk.
Week 5	Lab 5:Microbial examination of dairy product.
Week 6	Lab 6: Microbial examination of cheese.
Week 7	Lab 7:Detection of coliform.

Week 8	Lab 8:. Microbial examination of milk cattle have mastitis.
Week 9	Lab9: Microbial examination of flour and sugar.
Week10	Lab 10: Microbial examination of fruit juice.
Week 11	Lab 11: Microbial examination of meat.
Week 12	Lab 12: Microbial examination of frozen foods .
Week 13	Lab 13: Microbial examination of poultry meat and fish.
Week 14	Lab 14: Microbial examination of eggs .
Week 15	Lab 15: Microbial examination of eggs and Microbial examination of canned foods.

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Gerard J. Tortora , Berdell R. Funke ,Christine L. Case .(2013) Microbiology An Introduction, 11ed .**	Yes
	Willey ,J.M .; Sherwood,L.M.; Woolverton, C.J (2017). Prescott s Microbiology. 10th ed., McGraw-Hill Companies, U.S.A.	Yes
	Winn, W. C.; Allen.; S. D. J.; Janda, W. U.; Koneman, E. W.; Procop, G. W.; Schreckenbenberger, P. C. and Woods, G. L. (2006). " Koneman's Color Atlas and Text Book of Diagnostic Microbiology". 6th ed., Lippincott Williams and Wilkins, U.S.A.	Yes
Recommended Texts	**Karen M. (2007). Microbiology lab manual 2nd edithion.**	No
	petzoldt S. (2005). Fungi man and his environment.	No
Websites	https://www.frontiersin.org/articles/10.3389/fmicb.2020.00237/full https://www.researchgate.net/publication/288208448_Food_Microbiology	

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

Module Information معلومات المادة الدراسية					
Module Title	**Mycology**			**Module Delivery**	
Module Type	**Core**			☒Theory ☒ Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	**Bio2-47034**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	3		**Semester of Delivery**	7	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. Maha Akram Mohammed Ali		**e-mail**	mahaalrejaboo2@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Hadeel Ahmad Dr. Ali Abd		**e-mail**	hadsbio43@uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**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 Objectives أهداف المادة الدراسية	This study aims 1. Communicate information about fungi. 2. Sexual and non-sexual growth and reproduction. 3. How fungi are classified. 4. The role of fungi in nature. 5. Its beneficial effects. 6. Production of vitamins and antibiotics and their role in the food industry. 7. The harmful effects of fungi and their types that cause diseases. 8. Mycotoxins are dangerous to health. 9. Keeping up with the development that is happening in the world of laboratory materials and equipment.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**1.Identify fungi.** **2.Recognition between useful fungi and their damage .** **3. Getting good ways to storage of food .** **4. General description of fungi .** **5. Classification systems Classification of fungi .** **6. The economic importance of fungi.** **7. Modern methods of diagnosing fungus.**
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> I Introduction of fungi. History of mycology. Defined fungi. The fungal cell components part 1. The fungal cell components part 2[*10* hrs] . Types of fungal septa، The hyphal haustoria Growth and elongation of the hyphal top،. The life cycle of fungi , (Nucleur cycles(Reproduction of fungi ,part 1 Reproduction of fungi ,part 2[*8* hrs] Nutrition in fungi part 1 . Nutrition in fungi part 2. Metabolism. [*10* hrs] Mycotoxins definition .Classification of fungi [8 hrs] Revision problem classes [3 hrs] <u>Part B – Practical labs</u> Sterilization. The culture media. lsolation of microorgrnism from different sources: from air lsolation of microorgrnism from different sources: from water. lsolation of microorgrnism from soil . Growth of Fungi. Single Spore Isolation for Fungi . Slide culture technique. Collection of medical specimens: laboratory diagnosis of medical fungi . How to maintain or preserve isolated colonies .Methods used to sterilize antibiotics and heat-sensitive compounds . [20 hrs] Identification of common fungi.Identification of Candida by Analytic Profile Index (API 20C Aux:(Identification of pathogenic fungus by Analytic Profile Index (API 20C Aux:(

	Identification of Candida species by Polymerase Chain Reaction (PCR). [16 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents . Various techniques were used such as. Data show , Microscope, Posters .Students do study the following fields: Identify the funal. Identify the differences in cell components . The benefites and the damage of fungi . Mycotoxins. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction of fungi.
Week 2	History of mycology. Defined fungi.
Week 3	The fungal cell components part 1.
Week 4	The fungal cell components part 2.
Week 5	Types of fungal septa,
Week 6	The hyphal haustoria
Week 7	Growth and elongation of the hyphal top.,
Week 8	The life cycle of fungi , (Nucleur cycles)
Week 9	Reproduction of fungi ,part 1
Week 10	Reproduction of fungi ,part 2
Week 11	Nutrition in fungi part 1
Week 12	Nutrition in fungi part 2
Week 13	Metabolism .
Week 14	Mycotoxins definition
Week 15	Classification of fungi

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1:. Sterilization .
Week 2	Lab 2: The culture media .
Week 3	Lab 3: lsolation of microorgrnism from different sources: from air
Week 4	Lab 4: lsolation of microorgrnism from different sources: from water .
Week 5	Lab 5: lsolation of microorgrnism from soil.
Week 6	Lab 6: Growth of Fungi.
Week 7	Lab 7: Single Spore Isolation for Fungi .
Week 8	Lab 8: Slide culture technique.

Week 9	Lab9: Collection of medical specimens: laboratory diagnosis of medical fungi.
Week10	Lab 10: How to maintain or preserve isolated colonies.
Week 11	Lab 11: Methods used to sterilize antibiotics and heat-sensitive compounds .
Week 12	Lab 12: Identification of common fungi.
Week 13	Lab 13: Identification of Candida by Analytic Profile Index (API 20C Aux):
Week 14	Lab 14: Identification of pathogenic fungus by Analytic Profile Index (API 20C Aux):
Week 15	Lab 15: Identification of Candida species by Polymerase Chain Reaction (PCR).

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	oh Webster and Roland Weber .(2007). Introduction to fungi . --Tulasi Satyanarayana , Sunil K.Deshmukh and B.N. Johri Editors.(2017) Development in fungal biology and applied mycology.Springer nature Singapore PteLtd.	Yes Yes
Recommended Texts	Introduction to Modern Mycology 3rd Edition. J. W. Deacon. (2015)	No
Websites	https://www.ncbi.nlm.nih.gov/books/NBK8125/ https://www.youtube.com/watch?v=wqKNm_evkYA	

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

Module Information معلومات المادة الدراسية					
Module Title	**Optional** Enzymology			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☒ **Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**Bio2-47035**				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	4		**Semester of Delivery**	7	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. Mohammad Huseen		**e-mail**	mohsbio16@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Shafaq Tariq		**e-mail**	Shasbio108@uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**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 Objectives أهداف المادة الدراسية	This study aims **Students do study the following fields:** **1. Classification of enzymes** **2. Characteristic of enzymes** **3. Structure of enzymes**
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**1. Comprehension enzyme properties.** **2. Conception the enzymatic chemical reaction.** **3. Perception the application of enzymes.** **4. The Students learn how to prepare chemical solutions** **5. The students Learn how to prepare bacterial extract** **6. The students Learn how to detect different types of enzymes**
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Introduction to enzymology. General review of protein.Nomenclature of enzyme .Activation energy.Mechanism of enzyme action . Specificity of enzyme.Assay of enzyme and Units of enzyme activity.1.Assay of enzyme and Units of enzyme activity.2.[*10* hrs] Enzyme inhibition part 1 and 2.Enzyme inhibition part 1 and 2.Enzyme kinetics part 1 and 2.Enzyme kinetics part 1 and 2.[*10* hrs] Examples of enzyme inhibition.Clinical enzymology.Industrial enzymology. [8 hrs] Revision problem classes [3 hrs] Part B – Practical labs Introductin to Enzymes.: Preparing chemical solutions.Cell disruption methods1.Cell disruption methods2.Preparation of bacterial extract.Protease enzyme.Lipase enzyme. [18 hrs] Aspartate aminotransferase,Alanine aminotransferase.Decarboxylase enzyme .denitrification.Alkaline phosphatase.: Cytochrome oxidase.. catalase.Lecithinase .coagulase.of antibiotic:3.Production of biogas(methan.Solution preparation1.Solution preparation2. [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Teaching Techniques: The lectures are explained through audio files, videos and recording files of the lectures so that the student can refer to them whenever he wants that to avoid the problems of power outages and weak in internet.The lectures are also explained and communicating with students through the meeting by the Classroom for the purpose of agitation topics related to the scientific subject to be discussed in a scientific way.Students are given daily tests in order to keep the student in touch with the scientific material and to consolidate the information in the student's mind.Assigning students to answer intellectual questions about some topics and discussing them in the next lecture to develop the aims of scientific research and delve into the subtleties of the scientific material and study the various aspects of the subject in terms of its connection to other science and their applications. Assigning students to write some reports related to the scientific subject and their interaction with the scientific material to set grades that fall within the student's scientific assessment . Taking into consideration the student's attendance in lectures and the extent of his ability to participate in the discussions presented during the lectures, and this is part of the student's assessment methods. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Introduction to enzymology .
Week 2	General review of protein.
Week 3	Nomenclature of enzyme .
Week 4	Activation energy.
Week 5	Mechanism of enzyme action .
Week 6	. Specificity of enzyme.
Week 7	Assay of enzyme and Units of enzyme activity.1.
Week 8	Assay of enzyme and Units of enzyme activity.2.
Week 9	Enzyme inhibition part 1 and 2.
Week 10	Enzyme inhibition part 1 and 2.
Week 11	Enzyme kinetics part 1 and 2.
Week 12	Enzyme kinetics part 1 and 2.
Week 13	Examples of enzyme inhibition.
Week 14	Clinical enzymology.
Week 15	Industrial enzymology.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introductin to Enzymes.
Week 2	Lab 2: Preparing chemical solutions.
Week 3	Lab 3: Cell disruption methods1.
Week 4	Lab 4: Cell disruption methods2.
Week 5	Lab 5: Preparation of bacterial extract.
Week 6	Lab 6: Protease enzyme.
Week 7	Lab 7: Lipase enzyme.
Week 8	Lab 8: Aspartate aminotransferase,Alanine aminotransferase.
Week 9	Lab9: Decarboxylase enzyme .
Week10	Lab 10: denitrification.
Week 11	Lab 11: Alkaline phosphatase.
Week 12	Lab 12: Cytochrome oxidase.
Week 13	Lab 13: . catalase.
Week 14	Lab 14: Lecithinase .
Week 15	Lab 15: coagulase.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**1-Fundamentals of Biochemistry (2005) by Lehninger** **2-Enzyme Inhibition and Bioapplications (2012) by Rakesh Sharma** **3-Clinical chemistry and enzymology (2008) by Jaromir Kotyza and Radim Cerny.**	Yes Yes yes
Recommended Texts	**Murray, R. K., Bender, D.A., BothamEI, K.M., Kennelly, P.J., Rodwell, V.W., Weil, P.A. (2016). Harper,s Illustrated Biochemistry .29th edition. The Mc GRAW-Hill Companies, USA.**	Yes
Websites	https://www.slideshare.net/tonyscaria/enzymology-biochemistry-revision-notes	

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

Module Information معلومات المادة الدراسية					
Module Title	**Research Methodology**			**Module Delivery**	
Module Type	**Core**			☒Theory ☒ Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	**Bio2-47036**				
ECTS Credits	2				
SWL (hr/sem)	**50**				
Module Level		4	**Semester of Delivery**		7
Administering Department		Bio	**College**	Sci	
Module Leader	Dr. Rojan Ghanim		**e-mail**	rojsbio57@uomosul.edu.iq	
Module Leader's Acad. Title		Assist. Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor			**e-mail**		
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		1/10/2024	**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 Objectives أهداف المادة الدراسية	**This study aims** The objectives of the basics of scientific research encompass a range of foundational goals aimed at equipping individuals with the skills, knowledge, and mindset necessary for effective inquiry. Here's an organized breakdown: 1. **Understand Scientific Inquiry**: Grasp the systematic process of asking questions, investigating phenomena, and refining knowledge through structured methods. 2. **Develop Critical Thinking**: Cultivate the ability to analyze information, evaluate evidence, and reason logically to draw objective conclusions. 3. **Formulate Hypotheses/Questions**: Learn to craft testable hypotheses and research questions that guide investigations. 4. **Master Methodologies**: Gain proficiency in qualitative, quantitative, experimental, and observational research designs. 5. **Acquire Data Skills**: Learn techniques for collecting, organizing, and analyzing data using appropriate statistical or thematic tools. 6. **Uphold Ethics**: Adhere to integrity, transparency, and responsibility in research, including informed consent and data privacy. 7. **Communicate Findings**: Effectively share results through academic writing, presentations, and visualizations for peer and public engagement. 8. **Enhance Problem-Solving**: Apply structured approaches to address complex issues and propose evidence-based solutions. 9. **Expand Knowledge**: Contribute new insights to existing literature, driving intellectual and practical advancements. 10. **Support Evidence-Based Decisions**: Provide reliable data to inform policies, practices, and innovations across fields. 11. **Foster Innovation**: Stimulate technological and conceptual breakthroughs by exploring uncharted territories. 12. **Encourage Collaboration**: Promote teamwork and peer review to validate research quality and foster interdisciplinary progress. 13. **Nurture Curiosity**: Inspire a passion for discovery and openness to exploring novel ideas and challenges. 14. **Critique Literature**: Evaluate existing studies to identify gaps, biases, and opportunities for further research. 15. **Bridge Theory and Practice**: Apply theoretical frameworks to real-world problems, ensuring research relevance and impact. 16. **Promote Lifelong Learning**: Embrace continuous skill development and adaptability in an evolving scientific landscape.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**Module Learning Outcomes of *Basics of Scientific Research*** By the end of this module, learners will be able to: 1. **Demonstrate understanding of the scientific method** Explain the systematic steps of scientific inquiry (observation,

hypothesis, experimentation, analysis, conclusion).

2. **Formulate research questions and hypotheses**
   Design clear, testable, and focused research questions or hypotheses aligned with a defined problem or gap in knowledge.

3. **Select appropriate research methodologies**
   Compare qualitative, quantitative, experimental, and observational methods and choose the best fit for a research objective.

4. **Design a research proposal**
   Outline a structured research plan, including objectives, methodology, tools, timelines, and ethical considerations.

5. **Apply data collection and analysis techniques**
   Use tools (e.g., surveys, experiments, interviews) to gather data and apply basic statistical or thematic analysis to interpret results.

6. **Critically evaluate research literature**
   Analyze existing studies to identify strengths, weaknesses, gaps, and biases, and contextualize findings within broader scholarship.

7. **Adhere to ethical standards in research**
   Recognize ethical dilemmas (e.g., plagiarism, confidentiality, consent) and apply ethical guidelines to research design and execution.

8. **Communicate research findings effectively**
   Present results through academic writing, visual aids (charts, graphs), and oral presentations tailored to diverse audiences.

9. **Apply critical thinking to problem-solving**
   Evaluate evidence, identify logical fallacies, and propose evidence-based solutions to real-world or theoretical problems.

10. **Collaborate in peer-review processes**
    Provide constructive feedback on others' work and incorporate peer insights to refine research quality and validity.

11. **Use technology for research efficiency**
    Leverage digital tools (e.g., reference managers, data analysis software) to enhance research productivity and accuracy.

12. **Connect theory to practice**
    Translate theoretical concepts into practical research applications that address societal, environmental, or technical challenges.

13. **Develop a growth mindset for lifelong learning**

	Reflect on research experiences to identify areas for improvement and commit to continuous skill development in scientific inquiry.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> 1. Introduction to Scientific Research 2. The Scientific Method and Inquiry Process 3. Formulating Research Questions and Hypotheses 4. Research Design and Methodology 5. Literature Review and Critical Analysis 6. Data Collection Techniques 7. Data Analysis and Interpretation 8. Ethical Principles in Research 9. Scientific Writing and Communication 10. Technology and Tools for Research 11. Critical Thinking and Problem-Solving in Research 12. Peer Review and Collaborative Research 13. Applying Research to Real-World Problems 14. Capstone Project: Designing and Presenting a Research Proposal

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**Implementation Framework** • **Phase 1**: Foundational knowledge (lectures, tool training). • **Phase 2**: Application (workshops, micro-projects). • **Phase 3**: Synthesis (capstone projects, peer reviews). This approach ensures students gain both competency in scientific research methods and the critical, ethical, and collaborative mindset needed for impactful inquiry.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2.2

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**50**		

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)
المنهاج الأسبوعي النظري

	Material Covered
Week 1	**Introduction to Scientific Research:**Defining research, its purpose, and its role in advancing knowledge.
Week 2	**The Scientific Method and Inquiry Process:**Steps of systematic investigation: observation, hypothesis, experimentation, analysis, and conclusion.
Week 3	**Formulating Research Questions and Hypotheses:**Techniques for crafting focused, testable questions and hypotheses.
Week 4	**Research Design and Methodology:**Overview of qualitative, quantitative, experimental, and observational approaches.
Week 5	**Literature Review and Critical Analysis:**Strategies for sourcing, evaluating, and synthesizing existing scholarly work.
Week 6	**Data Collection Techniques:**Tools for gathering data: surveys, experiments, interviews, and observations.

Week 7	**Data Analysis and Interpretation:**Basic statistical methods and thematic analysis for qualitative and quantitative data.
Week 8	**Ethical Principles in Research:**Addressing plagiarism, informed consent, confidentiality, and research integrity.
Week 9	**Scientific Writing and Communication:**Structuring reports, abstracts, and papers; visualizing data (graphs, charts).
Week 10	**Technology and Tools for Research:**Using reference managers, data analysis software, and digital collaboration platforms.
Week 11	**Critical Thinking and Problem-Solving in Research:**Evaluating evidence, identifying biases, and addressing research challenges.
Week 12	**Peer Review and Collaborative Research**Engaging in constructive feedback and teamwork for quality assurance.
Week 13	**Applying Research to Real-World Problems** Translating findings into practical solutions for societal or technical issues.
Week 14	**Capstone Project: Designing:**Integrating knowledge to develop, execute.
Week 15	**Presenting a Research Proposal:** present a mini-research study.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	
Week 8	
Week 9	
Week10	
Week 11	
Week 12	
Week 13	
Week 14	

Week 15	

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	• Kothari, C. R., and Gaurav Garg. Research Methodology: Methods and Techniques. New Delhi: New Age International Publishers, 2019. Print • Kumar, Ranjit. Research Methodology: A Step by Step Guide for Beginners. Noida: Pearson India Education Services Pvt Ltd, 2007. Print.	Yes Yes
Recommended Texts	Stages in Scientific Research Process Presented by Ganesh Dive	No
Websites	• https://www.amnh.org/explore/videos/the-scientific-process • https://www.sciencebuddies.org/science-fair-projects/science-fair/steps-of-the-scientific-method • https://study.com/learn/lesson/scientific-method-example-steps.html • https://scientific-publishing.webshop.elsevier.com/manuscript-preparation/how-to-write-your-references-quickly-and-easily/	

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

Module Information معلومات المادة الدراسية					
Module Title	**Microbial Genetics**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Bio2-48037**				
ECTS Credits	6				
SWL (hr/sem)	**150**				
Module Level	4		**Semester of Delivery**	8	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. Rayan Mazin Faesal		**e-mail**	rayanmazin@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Ghada Abdulrazaq		**e-mail**	**kadsbio32@uomosul.edu.iq**	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**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 Objectives أهداف المادة الدراسية	This study aims 1- The course aims to show that microorganisms, especially bacteria, possess a genetic apparatus, contrary to what was rumored that the phenotypic differences in bacteria are based on adaptation. 2- This genetic system, in its molecular basis and in performing its various functions, does not differ from the genetic system of the rest of living organisms.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Enable students to understand the importance of mutations, if it is the source of genetic variation, or if the mutation is the source of many diseases and disorders. 2. Understand plasmids, their role in bacteria, types of their replication, and the importance of the genes they carry. 3. Understand how DNA is mobilized between bacteria either naturally or by genetic engineering. 4. Encouraged the students to improve their skills in critical thinking in genetic engineering techniques. 5. By studying this subject, student , could understand genetic microbiology. 6.Helping the student to understand molecular genetic strategies like PCR basics . 7. Encouraging student to develop their skills in laboratory tests. 8. understanding molecular biological studies, the manipulation of eukaryotic organisms, and practical applications (biotechnology) in diverse areas of life sciences.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures Introduction. Mutations and their types.1. Mutations and their types.2. DNA repair1. DNA repair2. Selection of mutants Selection of mutants[*18* hrs] Plasmids and copy number regulation1. Plasmids and copy number regulation2. Gene regulation part 1. Gene regulation part 2. Gene regulation part 3.[*18*hrs] Transformation and competence. Conjugation. transduction [8 hrs] Revision problem classes [3 hrs] Part B – Practical labs Introduction in genetic lab principles.Detection of spontaneous mutation.1.Detection of spontaneous mutation2.Detection of spontaneous mutation3.Detection of antibiotic resistance1.Detection of antibiotic resistance2. [18 hrs] Horizontal gene transfer: transformation1.Horizontal gene transfer: transformation2.Conjugation.PCR.electrophoresis.Plasmid isolation.Plasmid curing.Ames Test[18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents .Student Behavior in Class: were very good and polite.Teaching Techniques: Variety of methods: traditional and modern ways, like Online oral questions using Google meet ranging from easy to those that require critical thinking. Power-point presentations. Written tests. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

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

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	introduction
Week 2	Mutations and their types.1.
Week 3	Mutations and their types.2.
Week 4	DNA repair1.
Week 5	DNA repair2.
Week 6	Selection of mutants
Week 7	Selection of mutants
Week 8	Plasmids and copy number regulation1.
Week 9	Plasmids and copy number regulation2.
Week 10	Gene regulation part 1.
Week 11	Gene regulation part 2.
Week 12	Gene regulation part 3.
Week 13	Transformation and competence.
Week 14	Conjugation .
Week 15	transduction.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction in genetic lab principles.
Week 2	Lab 2:. Detection of spontaneous mutation.1.
Week 3	Lab 3: Detection of spontaneous mutation2.
Week 4	Lab 4: Detection of spontaneous mutation3.
Week 5	Lab 5: Detection of antibiotic resistance1.
Week 6	Lab 6: Detection of antibiotic resistance2.
Week 7	Lab 7: Horizontal gene transfer: transformation1.
Week 8	Lab 8: Horizontal gene transfer: transformation2.
Week 9	Lab9: Conjugation.
Week10	Lab 10: PCR.

Week 11	Lab 11: PCR.
Week 12	Lab 12: electrophoresis.
Week 13	Lab 13: Plasmid isolation.
Week 14	Lab 14: Plasmid curing.
Week 15	Lab 15: Ames Test

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Pierce, B. A. (2017). Genetics A conceptual Approach. 4th ed. W.H. freeman Macmillan Learning, New york.** **Brooker, R. J. (2018). Genetics Analysis & Principles. 6th ed. McGraw Hill Education.**	Yes Yes
Recommended Texts	**Snyder, L.; Peters, J.; Henkin, T. and Champness, W. (2013) Molecular genetics of bacteria. 4th ed. ASM press, USA.**	No
Websites	https://www.nature.com/subjects/microbial-genetics https://uomustansiriyah.edu.iq/media/lectures/6/6_2021_10_13!11_03_04_AM.pdf	

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
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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

Module Information معلومات المادة الدراسية					
Module Title	**Virology**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**Bio2-48038**				
ECTS Credits	6				
SWL (hr/sem)	**150**				
Module Level	4		**Semester of Delivery**	8	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. Anmar Ahmad		e-mail	anmaraltaee1978@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Anmar Ahmad		**e-mail**	**anmaraltaee1978@uomosul.edu.iq**	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**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 Objectives أهداف المادة الدراسية	This study aims 1. Provide information about viruses. 2. Its types. 3. classified. 4. structure. 5. diseases. 6. treat it. 7. prevention. 8. For students, a Encourage the student to keep abreast of the development taking place in virology in the world
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**1. They are filterable agents.** **2. They are obligate intracellular parasites.** **3. They contain a single type of nucleic acid, i.e., either DNA or RNA, but not both.** **4. The virion of the virus particle consists of a nucleic acid genome packaged into a protein coat (capsid), which itself is sometimes enclosed by an envelope of lipid, proteins, and carbohydrates known as envelope.** **5. They multiply inside the living cells by using the synthesizing machinery of the host cell.** **6. They replicate by the assembly of the individual components and do not replicate by division, such as binary fission.**
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures I History of Virology .Introduction of Virology. Virus Structure..Virus Nomenclature and Classification .General features of viral replication cycles and genetics.Spread of viral infection.Virus transmission .. [*18*hrs] Host resistance to viral infections.Bacteriophages.Medically important viruses.[*10* hrs] DNA enveloped viruses.DNA none enveloped viruses.RNA enveloped viruses.Human cancer viruses.Human cancer viruses2. [18 hrs] Revision problem classes [3 hrs] Part B – Practical labs Biological hazards and Sample preparation .Detection of viruses direct Examination using Light microscopy (Histological study.(Morphology study using Electron Microscopy (videos (Culture, Growth of virus on embryonated eggs. .Cell line and tissue culture techniques. Virus cultivation in tissue culture.Virus inculation in lab.animals.Bacteriophage plaque assay for phage titer.. [18 hrs] Serology detection of virus using ELISA.Serology detection of virus using

	Immunofluorescence techniques..Agglutination and precipitation test..Haemagglutination inhibition and Neutralization tests..Detection of viruses using molecular methods (nucleic acid extraction(.Viral Genome Detection: PCR technique..Real-Time PCR & DNA sequencing (videos) [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents .The viruses are too small to be seen with a light microscope. Their small size allows them to pass through filters that are used to retain back bacteria in contaminated fluids. Hence, they were first described as filterable agents. Viruses, like other microorganisms (e.g., bacteria, fungi, and parasites), are the infectious agents that are associated with disease in humans.The viruses unlike other infectious agents are obligate intracellular parasites, i.e., they absolutely require living host cells in order to multiply. In addition, viruses replicate by assembly of the individual components rather than by binary fission .This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #10, #11

assessment	**Assignments**	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	History of Virology
Week 2	Introduction of Virology
Week 3	Virus Structure
Week 4	Virus Nomenclature and Classification
Week 5	General features of viral replication cycles and genetics
Week 6	Spread of viral infection
Week 7	Virus transmission
Week 8	Host resistance to viral infections
Week 9	Bacteriophages
Week 10	Medically important viruses
Week 11	DNA enveloped viruses
Week 12	DNA none enveloped viruses
Week 13	RNA enveloped viruses
Week 14	Human cancer viruses
Week 15	Human cancer viruses2

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Biological hazards and Sample preparation
Week 2	Lab 2: Detection of viruses direct Examination using Light microscopy (Histological study).

Week 3	Lab 3: Morphology study using Electron Microscopy (videos)
Week 4	Lab 4: Culture, Growth of virus on embryonated eggs .
Week 5	Lab 5: Cell line and tissue culture techniques
Week 6	Lab 6: Virus cultivation in tissue culture.
Week 7	Lab 7: Virus inculation in lab.animals.
Week 8	Lab 8:. Bacteriophage plaque assay for phage titer.
Week 9	Lab9: Serology detection of virus using ELISA
Week10	Lab 10: Serology detection of virus using Immunofluorescence techniques.
Week 11	Lab 11: Agglutination and precipitation test.
Week 12	Lab 12: Haemagglutination inhibition and Neutralization tests.
Week 13	Lab 13: Detection of viruses using molecular methods (nucleic acid extraction)
Week 14	Lab 14: Viral Genome Detection: PCR technique.
Week 15	Lab 15: Real-Time PCR & DNA sequencing (videos)

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Tille, P., (2017). "Bailey & Scott's Diagnostic Microbiology" .14th ed. Elsevier . St. Louis, Missou.USA.** **Winn, W. C.; Allen.; S. D. J.; Janda, W. U.; Koneman, E. W.; Procop, G. W.; Schreckenbenberger, P. C. and Woods, G. L. (2006). " Koneman's Color Atlas and Text Book of Diagnostic Microbiology". 6th ed., Lippincott Williams and Wilkins, U.S.A.**	Yes Yes
Recommended Texts	**Riedel ,S., Morse, S.A., Mietzner, T., Miller ,S. (2019). Jawetz,Melnick & Adelberg s Medical Microbiology.28th ed. McGraw-Hill Companies, U.S.A.**	Yes
Websites	https://www.news-medical.net/health/What-is-Virology.aspx	

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

Module Information معلومات المادة الدراسية					
Module Title	**Industrial Microbiology**			**Module Delivery**	
Module Type	**Core**			☒Theory ☒ Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	**Bio2-48139**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	4		**Semester of Delivery**	8	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. Ameera Al-Rawi		**e-mail**	amesbio5@uomosul.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Alla Almola		**e-mail**	alasbio58@uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	1/10/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Food Microbiology	**Semester**	7
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	This study aims 1. Convey information to the student about the microorganisms used in the industry. 2. To produce organic acids. 3. Vaccines. 4. fermented food 5. Antibiotics.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**1. Students were able to understand the principles of industrial microbiology** **2.Help students how to master the role of microorganisms in industry** **3. Encouraging students to develop their skills and the application mechanisms of microbial industry and how to exploit them in the markit** **4- By studying this subject, the student could understand industrial microbiology and the importance of it .** **5. Helping the student to perfection the experiment of industrial microbiology** **6. Encouraging student to develop his skills in laboratory .** **7.Give students homework** **8.the lecture includes the principle of explanation, clarification, , discussion, practical aspects, etc.**
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Theoretical lectures **I**ntroduction.Industerial microbiology and Fermentation.Fermentation. Industerialmicroorganisms and its nutritional requirements،. fermentation media ;Extraction and purification of products.Fermenters ,metabolites, fermentation conditions.microbial production of enzymes.[*18* hrs] SCP production.bakery yeast production.Organic acid production؛Vitamins production.[*10* hrs] Fatty acids production;Ethanol and other solvents production.Antibiotic production.Beer production.Wine production. [18 hrs] Revision problem classes [3 hrs] Part B – Practical labs Requirement for industrial fermentation Production of ethanol and vinegar .Production of ethanol and vinegar. Production of lactic acid and glutamic acid by fermentation.Production of lactic acid and glutamic acid by fermentation.Industrial production of citric acid.Industrial production of citric acid.[18 hrs] Single cell protein.Production of antibiotic:penicillin.Production of antibiotic:2.Production of antibiotic:3.Production of biogas(methan.Solution preparation1.Solution preparation2. [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents . Various techniques were used such as. Data show , Microscope, Posters .Students do study the following fields:Fermentation and fermenters..Industeriaal microorganisms. Fermentation media and nutritional requirements .Microbial production of metabolites.Aerobic and Anaerobic fermented microbial production of :Bakery yeast production .SCP production .Antibiotic production.Vinegar production .Organic acids .Ethanol ,Aceton and other solvents .Microbiaproduction oEnzymes and Vitamins. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

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

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction.
Week 2	Industerial microbiology and Fermentation.
Week 3	Fermentation.
Week 4	Industerial microorganisms and its nutritional requirements ,.
Week 5	,fermentation media ;Extraction and purification of products.
Week 6	Fermenters ,metabolites,fermentation conditions.
Week 7	microbial production of enzymes.
Week 8	SCP production.
Week 9	bakery yeast production.
Week 10	Organic acid production;
Week 11	Vitamins production.
Week 12	Fatty acids production;Ethanol and other solvents production.
Week 13	Antibiotic production.
Week 14	Beer production.
Week 15	Wine production.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Requirement for industrial fermentation
Week 2	Lab 2: Production of ethanol and vinegar .
Week 3	Lab 3: Production of ethanol and vinegar .
Week 4	Lab 4: Production of lactic acid and glutamic acid by fermentation.
Week 5	Lab 5: Production of lactic acid and glutamic acid by fermentation.
Week 6	Lab 6: Industrial production of citric acid.
Week 7	Lab 7: Industrial production of citric acid.

Week 8	Lab 8:. Single cell protein.
Week 9	Lab9: Single cell protein.
Week10	Lab 10: Production of antibiotic:penicillin.
Week 11	Lab 11: Production of antibiotic:2.
Week 12	Lab 12: Production of antibiotic:3.
Week 13	Lab 13: Production of biogas(methan.
Week 14	Lab 14: Solution preparation1.
Week 15	Lab 15: Solution preparation2.

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Gerard J. Tortora , Berdell R. Funke ,Christine L. Case .(2013) Microbiology An Introduction, 11ed .** **Willey ,J.M .; Sherwood,L.M.; Woolverton, C.J (2017). Prescott s Microbiology. 10th ed., McGraw-Hill Companies, U.S.A.** **.**	Yes Yes
Recommended Texts	**Winn, W. C.; Allen.; S. D. J.; Janda, W. U.; Koneman, E. W.; Procop, G. W.; Schreckenbenberger, P. C. and Woods, G. L. (2006). " Koneman's Color Atlas and Text Book of Diagnostic Microbiology". 6th ed., Lippincott Williams and Wilkins, U.S.A**	Yes
Websites	https://www.nature.com/subjects/industrial-microbiology https://bio.libretexts.org/Bookshelves/Microbiology/Microbiology_(Boundless)/17%3A_Industrial_Microbiology	

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

Module Information معلومات المادة الدراسية					
Module Title	**Molecular Biology**			**Module Delivery**	
Module Type	**Core**			☒Theory ☒ Lecture ☒Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	**Bio2-48041**				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	4		**Semester of Delivery**	8	
Administering Department	Bio		**College**	Sci	
Module Leader	Dr. Firas Hameed		**e-mail**	@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Sahar Luqman Dr. Sahira Adrees		**e-mail**	sahira.scp5@student.uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	02/06/2023		**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 Objectives أهداف المادة الدراسية	This study aims 1. Understand the principles of biology at the molecular level. 2. Identifying the molecular structure of nucleic acids, their replication and their role in building protein 3. Understanding methods of controlling the level of gene expression in living cells. 4. Developing the student's perceptions by giving him an idea of recent trends in molecular biology. 5. Learn about modern applications of molecular genetics in various fields of life 6. Realizing the great progress in molecular genetics and its impact on human life.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1.Help the students to understands the genetic material nature and how it can be duplicated and transferred to the following off spring 2. Develops the students own skills to deal with genetic material and the mechanisms of its extraction and diagnosis different damage 3. Encourage students to discuss various problems and possible disease that occurred due to specific DNA Damages. 4. The students learn what are the advantages of DNA and RNA extraction. 5. The students know the types of cell disruption and distinguish between these types. 6. The students can distinguish between molecular techniques and other technique.
Indicative Contents **المحتويات الإرشادية**	Indicative content includes the following. <u>Part A – Theoretical lectures</u> Chemical structure**.** physical properties of Nucleic acids**.** DNA REPLICTION1**.** DNA REPLICTION2**.** Transcription of prokaryotic DNA1**.** Transcription of prokaryotic DNA2**.**[*10* hrs] , prokaryotic transcription**.** eukaryotic transcription**.** Translation in prokaryotics1**.** Translation in prokaryotics2**.**[*8* hrs] Main differences between pro and eukaryotic translation1**.** Main differences between pro and eukaryotic translation2**.** Pro and eukaryotic gene structure**.**[*10* hrs] Gene expression.1**.** Gene expression2. [8 hrs] Revision problem classes [3 hrs] <u>Part B – Practical labs</u> Introduction of information about laboratory safety**.**Introduction of cell disruption**.**DNA extraction **.**RNA extraction**.**Detection RNA and DNA.1**.**Detection RNA and DNA2**..**Estimation of DNA concentration and purity1**.**Estimation of DNA concentration and purity2**.** [18 hrs] PCR technique1**.**PCR technique2**.**Gel electrophoresis1**.**Gel electrophoresis2**.**Molecular techniques.1**.**Molecular techniques2**.**Molecular techniques3. [18 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents . Various techniques were used such as. Data show , Microscope, Posters Students do study the following fields: DNA Chemical structure and physical properties. Eukaryotic and Prokaryotic chromosome organization and packaging. Prokaryotic replication of DNA and eukaryotic differences. Protein synthesis , Transcription and Translation. Prokaryotic and eukaryotic gene structure.. Prokaryotic and eukaryotic gene expression (LAC Operon). This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Chemical structure .
Week 2	physical properties of Nucleic acids.
Week 3	DNA REPLICTION1.
Week 4	DNA REPLICTION2.
Week 5	Transcription of prokaryotic DNA1.
Week 6	Transcription of prokaryotic DNA2.
Week 7	prokaryotic transcription.
Week 8	eukaryotic transcription.
Week 9	Translation in prokaryotics1.
Week 10	Translation in prokaryotics2.
Week 11	Main differences between pro and eukaryotic translation1.
Week 12	Main differences between pro and eukaryotic translation2.
Week 13	Pro and eukaryotic gene structure.
Week 14	Gene expression.1.
Week 15	Gene expression2.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction of information about laboratory safety.
Week 2	Lab 2: Introduction of cell disruption.
Week 3	Lab 3: DNA extraction.
Week 4	Lab 4: RNA extraction.
Week 5	Lab 5: Detection RNA and DNA.1.
Week 6	Lab 6: Detection RNA and DNA2..
Week 7	Lab 7: Estimation of DNA concentration and purity1.
Week 8	Lab 8:. Estimation of DNA concentration and purity2.

Week 9	Lab9: PCR technique1.
Week10	Lab 10: PCR technique2.
Week 11	Lab 11: Gel electrophoresis1.
Week 12	Lab 12: Gel electrophoresis2.
Week 13	Lab 13: Molecular techniques.1.
Week 14	Lab 14: Molecular techniques2.
Week 15	Lab 15: Molecular techniques3.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**1- Vennison, S. J.(2009). Laboratory Manual for Genetic Engineering.** **2- O'Grady,S. et.al., (2011).Molecular Biology Techniques Laboratory Manual..** **3- Harish, P.(1992).Association for biology Education.** **4-Nucleic acid detection, ultrasensitive fluorescent, gel stains and quantitation reagents.** **5- Amin-ul Mannan, M. ; Sharma, S. and Ganesan , K. (2009). Total RNA isolation from recalcitrant yeast cells. Analytical Biochemistry, 389: 77-79.**	Yes No Yes NO Yes
Recommended Texts	**6- Maniatis, T.; Fritsch, E.F. and Sambrook, J. (1982). Molecular Cloning: A Laboratory Manual, Cold Spring Harbor Laboratory, Cold Springs Harbor, NY.**	Yes
Websites	www.zoo.utoronto.ca/able https:// www.austince.edu	

Grading Scheme مخطط الدرجات				
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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.