MODULE DESCRIPTION FORM

نموذج وصف مادة علم الحيوان العام

Module Information معلومات المادة الدراسية			
Module Title	General Zoology علم الحيوان العام		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [X] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-1101		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	UGI	Semester of Delivery	1
Administering Department	Biology / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	ساريا ناجي محسن صالح	e-mail	
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	فراس فارس رجا	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (2) Name	هاجر حارث	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Module Tutor (3) Name	Name	Acad. Title / Qualification	Academic Title / Qualification
Peer Reviewer Name	Name	e-mail	
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of General Zoology and its relevance to Life Sciences. 2. To explain the key principles related to scope of zoology and animal diversity, taxonomy and nomenclature, and body plans and symmetry. 3. To develop the ability to connect theoretical concepts of General Zoology with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to General Zoology. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of General Zoology.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of General Zoology (Remember). 2. Describe the main concepts of scope of zoology and animal diversity and taxonomy and nomenclature (Understand). 3. Explain the biological significance of body plans and symmetry and protozoan diversity and life cycles (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with General Zoology (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to Porifera and Cnidaria (Apply). 6. Compare selected examples, methods, or biological systems within General Zoology (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of General Zoology (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of General Zoology in health, environment, biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in General Zoology (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Scope of zoology and animal diversity: Concepts, terminology, mechanisms, representative examples, and applications related to taxonomy and nomenclature. [SSWL = 14 hrs] Unit 2 — Body plans and symmetry: Concepts, terminology, mechanisms, representative examples, and applications related to protozoan diversity and life cycles. [SSWL = 14 hrs] Unit 3 — Porifera and cnidaria: Concepts, terminology, mechanisms, representative examples, and applications related to Platyhelminthes, Nematoda and Annelida. [SSWL = 14 hrs]

	Unit 4 — Mollusca, arthropoda and echinodermata: Concepts, terminology, mechanisms, representative examples, and applications related to Chordata and vertebrate classes. [SSWL = 14 hrs] Unit 5 — Comparative anatomy and adaptations: Concepts, terminology, mechanisms, representative examples, and applications related to ecological roles of animals. [SSWL = 13 hrs] Unit 6 — Scope of zoology and animal diversity: Concepts, terminology, mechanisms, representative examples, and applications related to taxonomy and nomenclature. [SSWL = 13 hrs] Unit 7 — Body plans and symmetry: Concepts, terminology, mechanisms, representative examples, and applications related to protozoan diversity and life cycles. [SSWL = 13 hrs] Total Structured SWL = 95 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of General Zoology using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	95	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	80	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Scope of zoology and animal diversity: principles, terminology, representative examples, and relation to taxonomy and nomenclature.
Week 2	Taxonomy and nomenclature: principles, terminology, representative examples, and relation to body plans and symmetry.
Week 3	Body plans and symmetry: principles, terminology, representative examples, and relation to protozoan diversity and life cycles.
Week 4	Protozoan diversity and life cycles: principles, terminology, representative examples, and relation to Porifera and Cnidaria.
Week 5	Porifera and cnidaria: principles, terminology, representative examples, and relation to Platyhelminthes, Nematoda and Annelida.
Week 6	Platyhelminthes, nematoda and annelida: principles, terminology, representative examples, and relation to Mollusca, Arthropoda and Echinodermata.
Week 7	Midterm Exam + Mollusca, arthropoda and echinodermata: key concepts, examples, and interpretation.
Week 8	Chordata and vertebrate classes: principles, terminology, representative examples, and relation to comparative anatomy and adaptations.
Week 9	Comparative anatomy and adaptations: principles, terminology, representative examples, and relation to ecological roles of animals.
Week 10	Ecological roles of animals: principles, terminology, representative examples, and relation to scope of zoology and animal diversity.
Week 11	Scope of zoology and animal diversity: principles, terminology, representative examples, and relation to taxonomy and nomenclature.
Week 12	Taxonomy and nomenclature: principles, terminology, representative examples, and relation to body plans and symmetry.
Week 13	Body plans and symmetry: principles, terminology, representative examples, and relation to protozoan diversity and life cycles.
Week 14	Protozoan diversity and life cycles: principles, terminology, representative examples, and relation to Porifera and Cnidaria.
Week 15	Integration and revision: applications of Porifera and Cnidaria, Platyhelminthes, Nematoda and Annelida, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for General Zoology.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to scope of zoology and animal diversity; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to taxonomy and nomenclature; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to body plans and symmetry; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to protozoan diversity and life cycles; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to Porifera and Cnidaria; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to Platyhelminthes, Nematoda and Annelida; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to Mollusca, Arthropoda and Echinodermata; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to Chordata and vertebrate classes; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to comparative anatomy and adaptations; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to ecological roles of animals; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to scope of zoology and animal diversity; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to taxonomy and nomenclature; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to body plans and symmetry; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to protozoan diversity and life cycles; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Hickman, C.P. et al. (2017). Integrated Principles of Zoology (17th ed.). McGraw-Hill Education.	Yes
Recommended Texts	Ruppert, Fox & Barnes (2004). Invertebrate Zoology; Kardong (2018). Vertebrates.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف مادة الكيمياء تحليلية

Module Information معلومات المادة الدراسية			
Module Title	Analytical Chemistry كيمياء تحليلية		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [X] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-1102		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	UGI	Semester of Delivery	1
Administering Department	Biology/ علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	فدعم متعب عبدون	e-mail	
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	سرى اكريم	Acad. Title / Qualification	Assistant Lecturer / Ph.D.
Module Tutor (2) Name	Name	Acad. Title / Qualification	Academic Title / Qualification
Module Tutor (3) Name	Name	Acad. Title / Qualification	Academic Title / Qualification
Peer Reviewer Name	Name	e-mail	
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Analytical Chemistry and its relevance to Life Sciences. 2. To explain the key principles related to principles of analytical chemistry, sampling and sample preparation, and errors, accuracy and precision. 3. To develop the ability to connect theoretical concepts of Analytical Chemistry with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Analytical Chemistry. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Analytical Chemistry.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Analytical Chemistry (Remember). 2. Describe the main concepts of principles of analytical chemistry and sampling and sample preparation (Understand). 3. Explain the biological significance of errors, accuracy and precision and gravimetric analysis (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Analytical Chemistry (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to acid-base titrations (Apply). 6. Compare selected examples, methods, or biological systems within Analytical Chemistry (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Analytical Chemistry (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Analytical Chemistry in health, environment, biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Analytical Chemistry (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Principles of analytical chemistry: Concepts, terminology, mechanisms, representative examples, and applications related to sampling and sample preparation. [SSWL = 14 hrs] Unit 2 — Errors, accuracy and precision: Concepts, terminology, mechanisms, representative examples, and applications related to gravimetric analysis. [SSWL = 14 hrs]

	Unit 3 — Acid-base titrations: Concepts, terminology, mechanisms, representative examples, and applications related to redox titrations. [SSWL = 14 hrs] Unit 4 — Complexometric titrations: Concepts, terminology, mechanisms, representative examples, and applications related to precipitation titrations. [SSWL = 14 hrs] Unit 5 — Spectrophotometric methods: Concepts, terminology, mechanisms, representative examples, and applications related to chromatographic separation. [SSWL = 13 hrs] Unit 6 — Quality assurance and calibration: Concepts, terminology, mechanisms, representative examples, and applications related to principles of analytical chemistry. [SSWL = 13 hrs] Unit 7 — Sampling and sample preparation: Concepts, terminology, mechanisms, representative examples, and applications related to errors, accuracy and precision. [SSWL = 13 hrs] Total Structured SWL = 95 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Analytical Chemistry using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	95	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	80	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Principles of analytical chemistry: principles, terminology, representative examples, and relation to sampling and sample preparation.
Week 2	Sampling and sample preparation: principles, terminology, representative examples, and relation to errors, accuracy and precision.
Week 3	Errors, accuracy and precision: principles, terminology, representative examples, and relation to gravimetric analysis.
Week 4	Gravimetric analysis: principles, terminology, representative examples, and relation to acid-base titrations.
Week 5	Acid-base titrations: principles, terminology, representative examples, and relation to redox titrations.
Week 6	Redox titrations: principles, terminology, representative examples, and relation to complexometric titrations.
Week 7	Midterm Exam + Complexometric titrations: key concepts, examples, and interpretation.
Week 8	Precipitation titrations: principles, terminology, representative examples, and relation to spectrophotometric methods.
Week 9	Spectrophotometric methods: principles, terminology, representative examples, and relation to chromatographic separation.
Week 10	Chromatographic separation: principles, terminology, representative examples, and relation to quality assurance and calibration.
Week 11	Quality assurance and calibration: principles, terminology, representative examples, and relation to principles of analytical chemistry.
Week 12	Principles of analytical chemistry: principles, terminology, representative examples, and relation to sampling and sample preparation.
Week 13	Sampling and sample preparation: principles, terminology, representative examples, and relation to errors, accuracy and precision.
Week 14	Errors, accuracy and precision: principles, terminology, representative examples, and relation to gravimetric analysis.
Week 15	Integration and revision: applications of gravimetric analysis, acid-base titrations, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر

Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Analytical Chemistry.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to principles of analytical chemistry; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to sampling and sample preparation; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to errors, accuracy and precision; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to gravimetric analysis; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to acid-base titrations; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to redox titrations; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to complexometric titrations; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to precipitation titrations; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to spectrophotometric methods; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to chromatographic separation; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to quality assurance and calibration; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to principles of analytical chemistry; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to sampling and sample preparation; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to errors, accuracy and precision; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Skoog, West, Holler & Crouch. Fundamentals of Analytical Chemistry.	Yes
Recommended Texts	Harris, D.C. Quantitative Chemical Analysis.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف مادة الرياضيات العامة

Module Information معلومات المادة الدراسية			
Module Title	General Mathematics الرياضيات العامة		Module Delivery
Module Type	Basic		[X] Theory [X] Lecture [ ] Lab [X] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-1103		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	UGI	Semester of Delivery	1
Administering Department	Biology / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	سامر رعد ياسين	e-mail	
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	Name	Acad. Title / Qualification	Academic Title / Qualification
Module Tutor (2) Name	Name	Acad. Title / Qualification	Academic Title / Qualification
Module Tutor (3) Name	Name	Acad. Title / Qualification	Academic Title / Qualification
Peer Reviewer Name	Name	e-mail	
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of General Mathematics and its relevance to Life Sciences. 2. To explain the key principles related to algebraic expressions and equations, functions and graphs, and limits and continuity. 3. To develop the ability to connect theoretical concepts of General Mathematics with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to General Mathematics. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of General Mathematics.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of General Mathematics (Remember). 2. Describe the main concepts of algebraic expressions and equations and functions and graphs (Understand). 3. Explain the biological significance of limits and continuity and differentiation and applications (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with General Mathematics (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to integration and applications (Apply). 6. Compare selected examples, methods, or biological systems within General Mathematics (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of General Mathematics (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of General Mathematics in health, environment, biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in General Mathematics (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Algebraic expressions and equations: Concepts, terminology, mechanisms, representative examples, and applications related to functions and graphs. [SSWL = 12 hrs] Unit 2 — Limits and continuity: Concepts, terminology, mechanisms, representative examples, and applications related to differentiation and applications. [SSWL = 12 hrs] Unit 3 — Integration and applications: Concepts, terminology, mechanisms, representative examples, and applications related to matrices and determinants. [SSWL = 12 hrs] Unit 4 — Introductory differential equations: Concepts, terminology, mechanisms, representative examples, and

	applications related to probability and biological applications. [SSWL = 11 hrs] Unit 5 — Descriptive statistics: Concepts, terminology, mechanisms, representative examples, and applications related to mathematical modelling in life sciences. [SSWL = 11 hrs] Unit 6 — Algebraic expressions and equations: Concepts, terminology, mechanisms, representative examples, and applications related to functions and graphs. [SSWL = 11 hrs] Unit 7 — Limits and continuity: Concepts, terminology, mechanisms, representative examples, and applications related to differentiation and applications. [SSWL = 11 hrs] Total Structured SWL = 80 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs lectures, directed reading, classroom discussion, short assignments, and applied examples. Teaching focuses on building conceptual understanding of General Mathematics, improving academic communication, and linking the subject to the wider Life Sciences curriculum. Students are encouraged to participate actively, complete weekly tasks, and use feedback to improve written and oral performance.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	80	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	70	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Algebraic expressions and equations: principles, terminology, representative examples, and relation to functions and graphs.
Week 2	Functions and graphs: principles, terminology, representative examples, and relation to limits and continuity.
Week 3	Limits and continuity: principles, terminology, representative examples, and relation to differentiation and applications.
Week 4	Differentiation and applications: principles, terminology, representative examples, and relation to integration and applications.
Week 5	Integration and applications: principles, terminology, representative examples, and relation to matrices and determinants.
Week 6	Matrices and determinants: principles, terminology, representative examples, and relation to introductory differential equations.
Week 7	Midterm Exam + Introductory differential equations: key concepts, examples, and interpretation.
Week 8	Probability and biological applications: principles, terminology, representative examples, and relation to descriptive statistics.
Week 9	Descriptive statistics: principles, terminology, representative examples, and relation to mathematical modelling in life sciences.
Week 10	Mathematical modelling in life sciences: principles, terminology, representative examples, and relation to algebraic expressions and equations.
Week 11	Algebraic expressions and equations: principles, terminology, representative examples, and relation to functions and graphs.
Week 12	Functions and graphs: principles, terminology, representative examples, and relation to limits and continuity.
Week 13	Limits and continuity: principles, terminology, representative examples, and relation to differentiation and applications.
Week 14	Differentiation and applications: principles, terminology, representative examples, and relation to integration and applications.
Week 15	Integration and revision: applications of integration and applications, matrices and determinants, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Course notes prepared by the Department of Life Sciences and an approved recent textbook in the field.	Yes
Recommended Texts	Recent peer-reviewed articles, laboratory manuals, and open educational resources relevant to the module.	No

Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف مادة الفيزياء الحياتية

Module Information معلومات المادة الدراسية			
Module Title	Biophysics الفيزياء الحياتية		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [X] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-1104		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	UGI	Semester of Delivery	1
Administering Department	Biology / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	حسين خضير	e-mail	
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Qualification
Module Tutor (1) Name	Name	Acad. Title / Qualification	Academic Title / Qualification
Module Tutor (2) Name	Name	Acad. Title / Qualification	Academic Title / Qualification
Module Tutor (3) Name	Name	Acad. Title / Qualification	Academic Title / Qualification
Peer Reviewer Name	Name	e-mail	
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Biophysics and its relevance to Life Sciences. 2. To explain the key principles related to physical principles in biological systems, mechanics and biomechanics, and fluid flow and diffusion. 3. To develop the ability to connect theoretical concepts of Biophysics with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Biophysics. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Biophysics.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Biophysics (Remember). 2. Describe the main concepts of physical principles in biological systems and mechanics and biomechanics (Understand). 3. Explain the biological significance of fluid flow and diffusion and thermodynamics and bioenergetics (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Biophysics (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to membrane potentials and bioelectricity (Apply). 6. Compare selected examples, methods, or biological systems within Biophysics (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Biophysics (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Biophysics in health, environment, biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Biophysics (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Physical principles in biological systems: Concepts, terminology, mechanisms, representative examples, and applications related to mechanics and biomechanics. [SSWL = 14 hrs] Unit 2 — Fluid flow and diffusion: Concepts, terminology, mechanisms, representative examples, and applications related to thermodynamics and bioenergetics. [SSWL = 14 hrs] Unit 3 — Membrane potentials and bioelectricity: Concepts, terminology, mechanisms, representative examples, and applications related to optics and microscopy. [SSWL = 14 hrs]

	Unit 4 — Radiation biology: Concepts, terminology, mechanisms, representative examples, and applications related to sound and ultrasound. [SSWL = 14 hrs] Unit 5 — Biophysical instrumentation: Concepts, terminology, mechanisms, representative examples, and applications related to medical and biological imaging. [SSWL = 13 hrs] Unit 6 — Physical principles in biological systems: Concepts, terminology, mechanisms, representative examples, and applications related to mechanics and biomechanics. [SSWL = 13 hrs] Unit 7 — Fluid flow and diffusion: Concepts, terminology, mechanisms, representative examples, and applications related to thermodynamics and bioenergetics. [SSWL = 13 hrs] Total Structured SWL = 95 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Biophysics using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	95	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	55	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Physical principles in biological systems: principles, terminology, representative examples, and relation to mechanics and biomechanics.
Week 2	Mechanics and biomechanics: principles, terminology, representative examples, and relation to fluid flow and diffusion.
Week 3	Fluid flow and diffusion: principles, terminology, representative examples, and relation to thermodynamics and bioenergetics.
Week 4	Thermodynamics and bioenergetics: principles, terminology, representative examples, and relation to membrane potentials and bioelectricity.
Week 5	Membrane potentials and bioelectricity: principles, terminology, representative examples, and relation to optics and microscopy.
Week 6	Optics and microscopy: principles, terminology, representative examples, and relation to radiation biology.
Week 7	Midterm Exam + Radiation biology: key concepts, examples, and interpretation.
Week 8	Sound and ultrasound: principles, terminology, representative examples, and relation to biophysical instrumentation.
Week 9	Biophysical instrumentation: principles, terminology, representative examples, and relation to medical and biological imaging.
Week 10	Medical and biological imaging: principles, terminology, representative examples, and relation to physical principles in biological systems.
Week 11	Physical principles in biological systems: principles, terminology, representative examples, and relation to mechanics and biomechanics.
Week 12	Mechanics and biomechanics: principles, terminology, representative examples, and relation to fluid flow and diffusion.
Week 13	Fluid flow and diffusion: principles, terminology, representative examples, and relation to thermodynamics and bioenergetics.
Week 14	Thermodynamics and bioenergetics: principles, terminology, representative examples, and relation to membrane potentials and bioelectricity.
Week 15	Integration and revision: applications of membrane potentials and bioelectricity, optics and microscopy, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Biophysics.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to physical principles in biological systems; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to mechanics and biomechanics; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to fluid flow and diffusion; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to thermodynamics and bioenergetics; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to membrane potentials and bioelectricity; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to optics and microscopy; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to radiation biology; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to sound and ultrasound; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to biophysical instrumentation; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to medical and biological imaging; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to physical principles in biological systems; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to mechanics and biomechanics; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to fluid flow and diffusion; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to thermodynamics and bioenergetics; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Course notes prepared by the Department of Life Sciences and an approved recent textbook in the field.	Yes
Recommended Texts	Recent peer-reviewed articles, laboratory manuals, and open educational resources relevant to the module.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية حقوق انسان وديقراطية

Module Information معلومات المادة الدراسية			
Module Title	Human Rights and Democracy حقوق انسان وديقراطية		Module Delivery
Module Type	Basic		[X] Theory [X] Lecture [ ] Lab [ ] Tutorial [ ] Practical [ ] Seminar
Module Code	UNI-1105		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	UGI	Semester of Delivery	1
Administering Department	Biology / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	غزوان حسين	e-mail	
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	Name	Acad. Title / Qualification	Academic Title / Qualification
Module Tutor (2) Name	Name	Acad. Title / Qualification	Academic Title / Qualification
Module Tutor (3) Name	Name	Acad. Title / Qualification	Academic Title / Qualification
Peer Reviewer Name	Name	e-mail	
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Human Rights and Democracy and its relevance to Life Sciences. 2. To explain the key principles related to concepts of human rights, international human rights declarations, and constitutional rights and citizenship. 3. To develop the ability to connect theoretical concepts of Human Rights and Democracy with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Human Rights and Democracy. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Human Rights and Democracy.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Human Rights and Democracy (Remember). 2. Describe the main concepts of concepts of human rights and international human rights declarations (Understand). 3. Explain the biological significance of constitutional rights and citizenship and principles of democracy (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Human Rights and Democracy (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to rule of law and separation of powers (Apply). 6. Compare selected examples, methods, or biological systems within Human Rights and Democracy (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Human Rights and Democracy (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Human Rights and Democracy in health, environment, biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Human Rights and Democracy (Create).
Indicative Contents	Unit 1 — Concepts of human rights: Concepts, terminology, mechanisms, representative examples, and

المحتويات الإرشادية	applications related to international human rights declarations. [SSWL = 5 hrs] Unit 2 — Constitutional rights and citizenship: Concepts, terminology, mechanisms, representative examples, and applications related to principles of democracy. [SSWL = 5 hrs] Unit 3 — Rule of law and separation of powers: Concepts, terminology, mechanisms, representative examples, and applications related to civil society and participation. [SSWL = 5 hrs] Unit 4 — Rights and duties in academic life: Concepts, terminology, mechanisms, representative examples, and applications related to sustainable development and equality. [SSWL = 5 hrs] Unit 5 — Ethics of public responsibility: Concepts, terminology, mechanisms, representative examples, and applications related to concepts of human rights. [SSWL = 5 hrs] Unit 6 — International human rights declarations: Concepts, terminology, mechanisms, representative examples, and applications related to constitutional rights and citizenship. [SSWL = 4 hrs] Unit 7 — Principles of democracy: Concepts, terminology, mechanisms, representative examples, and applications related to rule of law and separation of powers. [SSWL = 4 hrs] Total Structured SWL = 33 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs lectures, directed reading, classroom discussion, short assignments, and applied examples. Teaching focuses on building conceptual understanding of Human Rights and Democracy, improving academic communication, and linking the subject to the wider Life Sciences curriculum. Students are encouraged to participate actively, complete weekly tasks, and use feedback to improve written and oral performance.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Concepts of human rights: principles, terminology, representative examples, and relation to international human rights declarations.
Week 2	International human rights declarations: principles, terminology, representative examples, and relation to constitutional rights and citizenship.
Week 3	Constitutional rights and citizenship: principles, terminology, representative examples, and relation to principles of democracy.
Week 4	Principles of democracy: principles, terminology, representative examples, and relation to rule of law and separation of powers.
Week 5	Rule of law and separation of powers: principles, terminology, representative examples, and relation to civil society and participation.
Week 6	Civil society and participation: principles, terminology, representative examples, and relation to rights and duties in academic life.
Week 7	Midterm Exam + Rights and duties in academic life: key concepts, examples, and interpretation.
Week 8	Sustainable development and equality: principles, terminology, representative examples, and relation to ethics of public responsibility.
Week 9	Ethics of public responsibility: principles, terminology, representative examples, and relation to concepts of human rights.
Week 10	Concepts of human rights: principles, terminology, representative examples, and relation to international human rights declarations.
Week 11	International human rights declarations: principles, terminology, representative examples, and relation to constitutional rights and citizenship.
Week 12	Constitutional rights and citizenship: principles, terminology, representative examples, and relation to principles of democracy.
Week 13	Principles of democracy: principles, terminology, representative examples, and relation to rule of law and separation of powers.
Week 14	Rule of law and separation of powers: principles, terminology, representative examples, and relation to civil society and participation.

Week 15	Integration and revision: applications of civil society and participation, rights and duties in academic life, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Course notes prepared by the Department of Life Sciences and an approved recent textbook in the field.	Yes
Recommended Texts	Recent peer-reviewed articles, laboratory manuals, and open educational resources relevant to the module.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف مادة اللغة العربية

Module Information معلومات المادة الدراسية			
Module Title	Arabic Language اللغة العربية		Module Delivery
Module Type	Basic		[X] Theory [X] Lecture [ ] Lab [ ] Tutorial [ ] Practical [ ] Seminar
Module Code	UNI-1106		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	UGI	Semester of Delivery	1
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	ابتهال امين حميدي	e-mail	
Module Leader's Acad. Title	Assistant Lecturer	Module Leader's Qualification	M.Sc.
Module Tutor (1) Name	Name	Acad. Title / Qualification	Academic Title / Qualification
Module Tutor (2) Name	Name	Acad. Title / Qualification	Academic Title / Qualification
Module Tutor (3) Name	Name	Acad. Title / Qualification	Academic Title / Qualification
Peer Reviewer Name	Name	e-mail	
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Arabic Language and its relevance to Life Sciences. 2. To explain the key principles related to Arabic language skills, grammar essentials, and scientific and administrative writing. 3. To develop the ability to connect theoretical concepts of Arabic Language with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Arabic Language. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Arabic Language.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Arabic Language (Remember). 2. Describe the main concepts of Arabic language skills and grammar essentials (Understand). 3. Explain the biological significance of scientific and administrative writing and rhetoric and expression (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Arabic Language (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to reading comprehension (Apply). 6. Compare selected examples, methods, or biological systems within Arabic Language (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Arabic Language (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Arabic Language in health, environment, biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Arabic Language (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Arabic language skills: Concepts, terminology, mechanisms, representative examples, and applications related to grammar essentials. [SSWL = 5 hrs] Unit 2 — Scientific and administrative writing: Concepts, terminology, mechanisms, representative examples, and applications related to rhetoric and expression. [SSWL = 5 hrs] Unit 3 — Reading comprehension: Concepts, terminology, mechanisms, representative examples, and applications related to summarising and paraphrasing. [SSWL = 5 hrs] Unit 4 — Academic terminology: Concepts, terminology, mechanisms, representative examples, and applications

	related to common linguistic errors. [SSWL = 5 hrs] Unit 5 — Presentation and communication: Concepts, terminology, mechanisms, representative examples, and applications related to Arabic language skills. [SSWL = 5 hrs] Unit 6 — Grammar essentials: Concepts, terminology, mechanisms, representative examples, and applications related to scientific and administrative writing. [SSWL = 4 hrs] Unit 7 — Rhetoric and expression: Concepts, terminology, mechanisms, representative examples, and applications related to reading comprehension. [SSWL = 4 hrs] Total Structured SWL = 33 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs lectures, directed reading, classroom discussion, short assignments, and applied examples. Teaching focuses on building conceptual understanding of Arabic Language, improving academic communication, and linking the subject to the wider Life Sciences curriculum. Students are encouraged to participate actively, complete weekly tasks, and use feedback to improve written and oral performance.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Arabic language skills: principles, terminology, representative examples, and relation to grammar essentials.
Week 2	Grammar essentials: principles, terminology, representative examples, and relation to scientific and administrative writing.
Week 3	Scientific and administrative writing: principles, terminology, representative examples, and relation to rhetoric and expression.
Week 4	Rhetoric and expression: principles, terminology, representative examples, and relation to reading comprehension.
Week 5	Reading comprehension: principles, terminology, representative examples, and relation to summarising and paraphrasing.
Week 6	Summarising and paraphrasing: principles, terminology, representative examples, and relation to academic terminology.
Week 7	Midterm Exam + Academic terminology: key concepts, examples, and interpretation.
Week 8	Common linguistic errors: principles, terminology, representative examples, and relation to presentation and communication.
Week 9	Presentation and communication: principles, terminology, representative examples, and relation to Arabic language skills.
Week 10	Arabic language skills: principles, terminology, representative examples, and relation to grammar essentials.
Week 11	Grammar essentials: principles, terminology, representative examples, and relation to scientific and administrative writing.
Week 12	Scientific and administrative writing: principles, terminology, representative examples, and relation to rhetoric and expression.
Week 13	Rhetoric and expression: principles, terminology, representative examples, and relation to reading comprehension.
Week 14	Reading comprehension: principles, terminology, representative examples, and relation to summarising and paraphrasing.
Week 15	Integration and revision: applications of summarising and paraphrasing, academic terminology, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Course notes prepared by the Department of Life Sciences and an approved recent textbook in the field.	Yes
Recommended Texts	Recent peer-reviewed articles, laboratory manuals, and open educational resources relevant to the module.	No
Websites	https://www.ncbi.nlm.nih.gov/books/	Online resources

	https://scholar.google.com https://www.khanacademy.org/science	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	General Botany علم النبات العام		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [X] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-1207		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	UGI	Semester of Delivery	2
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	ايمن عدوان عبد	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	بلال احمد عبد الله حسين	Acad. Title / Qualification	Lecturer / Ph.D.
Module Tutor (2) Name	رواد خلف حميد	Acad. Title / Qualification	Lecturer / M.Sc.
Module Tutor (3) Name	عمر وسام	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of General Botany and its relevance to Life Sciences. 2. To explain the key principles related to plant cell and tissues, plant morphology, and root, stem and leaf structure. 3. To develop the ability to connect theoretical concepts of General Botany with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to General Botany. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of General Botany.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of General Botany (Remember). 2. Describe the main concepts of plant cell and tissues and plant morphology (Understand). 3. Explain the biological significance of root, stem and leaf structure and plant reproduction (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with General Botany (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to plant diversity (Apply). 6. Compare selected examples, methods, or biological systems within General Botany (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of General Botany (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of General Botany in health, environment,

	biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in General Botany (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Plant cell and tissues: Concepts, terminology, mechanisms, representative examples, and applications related to plant morphology. [SSWL = 14 hrs] Unit 2 — Root, stem and leaf structure: Concepts, terminology, mechanisms, representative examples, and applications related to plant reproduction. [SSWL = 14 hrs] Unit 3 — Plant diversity: Concepts, terminology, mechanisms, representative examples, and applications related to algae and bryophytes. [SSWL = 14 hrs] Unit 4 — Pteridophytes and gymnosperms: Concepts, terminology, mechanisms, representative examples, and applications related to angiosperm characteristics. [SSWL = 14 hrs] Unit 5 — Basic plant physiology: Concepts, terminology, mechanisms, representative examples, and applications related to botanical classification. [SSWL = 13 hrs] Unit 6 — Plant cell and tissues: Concepts, terminology, mechanisms, representative examples, and applications related to plant morphology. [SSWL = 13 hrs] Unit 7 — Root, stem and leaf structure: Concepts, terminology, mechanisms, representative examples, and applications related to plant reproduction. [SSWL = 13 hrs] Total Structured SWL = 95 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of General Botany using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	95	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	80	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Plant cell and tissues: principles, terminology, representative examples, and relation to plant morphology.
Week 2	Plant morphology: principles, terminology, representative examples, and relation to root, stem and leaf structure.
Week 3	Root, stem and leaf structure: principles, terminology, representative examples, and relation to plant reproduction.

Week 4	Plant reproduction: principles, terminology, representative examples, and relation to plant diversity.
Week 5	Plant diversity: principles, terminology, representative examples, and relation to algae and bryophytes.
Week 6	Algae and bryophytes: principles, terminology, representative examples, and relation to pteridophytes and gymnosperms.
Week 7	Midterm Exam + Pteridophytes and gymnosperms: key concepts, examples, and interpretation.
Week 8	Angiosperm characteristics: principles, terminology, representative examples, and relation to basic plant physiology.
Week 9	Basic plant physiology: principles, terminology, representative examples, and relation to botanical classification.
Week 10	Botanical classification: principles, terminology, representative examples, and relation to plant cell and tissues.
Week 11	Plant cell and tissues: principles, terminology, representative examples, and relation to plant morphology.
Week 12	Plant morphology: principles, terminology, representative examples, and relation to root, stem and leaf structure.
Week 13	Root, stem and leaf structure: principles, terminology, representative examples, and relation to plant reproduction.
Week 14	Plant reproduction: principles, terminology, representative examples, and relation to plant diversity.
Week 15	Integration and revision: applications of plant diversity, algae and bryophytes, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for General Botany.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to plant cell and tissues; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to plant morphology; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to root, stem and leaf structure; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to plant reproduction; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to plant diversity; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to algae and bryophytes; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to pteridophytes and gymnosperms; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to angiosperm characteristics; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to basic plant physiology; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to botanical classification; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to plant cell and tissues; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to plant morphology; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to root, stem and leaf structure; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to plant reproduction; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Taiz et al. Plant Physiology and Development / Raven Biology of Plants.	Yes
Recommended Texts	Selected flora, taxonomy, and plant science atlases approved by the department.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Organic Chemistry كيمياء عضوية		Module Delivery
Module Type	Basic		[X] Theory [X] Lecture [X] Lab [X] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-1208		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	UGI	Semester of Delivery	2
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	هبه حمزه	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	خزعل حمد ندا	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Module Tutor (2) Name	Name [يحتاج تعبئة من القسم العلمي]	Acad. Title / Qualification	Academic Title / Qualification
Module Tutor (3) Name	Name [يحتاج تعبئة من القسم العلمي]	Acad. Title / Qualification	Academic Title / Qualification
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Organic Chemistry and its relevance to Life Sciences. 2. To explain the key principles related to bonding and hybridisation, functional groups, and alkanes and cycloalkanes. 3. To develop the ability to connect theoretical concepts of Organic Chemistry with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Organic Chemistry. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Organic Chemistry.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Organic Chemistry (Remember). 2. Describe the main concepts of bonding and hybridisation and functional groups (Understand). 3. Explain the biological significance of alkanes and cycloalkanes and alkenes and alkynes (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Organic Chemistry (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to aromatic compounds (Apply). 6. Compare selected examples, methods, or biological systems within Organic Chemistry (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Organic Chemistry (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Organic Chemistry in health,

	environment, biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Organic Chemistry (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Bonding and hybridisation: Concepts, terminology, mechanisms, representative examples, and applications related to functional groups. [SSWL = 14 hrs] Unit 2 — Alkanes and cycloalkanes: Concepts, terminology, mechanisms, representative examples, and applications related to alkenes and alkynes. [SSWL = 14 hrs] Unit 3 — Aromatic compounds: Concepts, terminology, mechanisms, representative examples, and applications related to alcohols and phenols. [SSWL = 14 hrs] Unit 4 — Aldehydes and ketones: Concepts, terminology, mechanisms, representative examples, and applications related to carboxylic acids and derivatives. [SSWL = 14 hrs] Unit 5 — Amines and heterocycles: Concepts, terminology, mechanisms, representative examples, and applications related to biologically important organic molecules. [SSWL = 13 hrs] Unit 6 — Bonding and hybridisation: Concepts, terminology, mechanisms, representative examples, and applications related to functional groups. [SSWL = 13 hrs] Unit 7 — Alkanes and cycloalkanes: Concepts, terminology, mechanisms, representative examples, and applications related to alkenes and alkynes. [SSWL = 13 hrs] Total Structured SWL = 95 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Organic Chemistry using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	95	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	80	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Bonding and hybridisation: principles, terminology, representative examples, and relation to functional groups.
Week 2	Functional groups: principles, terminology, representative examples, and relation to alkanes and cycloalkanes.
Week 3	Alkanes and cycloalkanes: principles, terminology, representative examples, and relation to alkenes and alkynes.

Week 4	Alkenes and alkynes: principles, terminology, representative examples, and relation to aromatic compounds.
Week 5	Aromatic compounds: principles, terminology, representative examples, and relation to alcohols and phenols.
Week 6	Alcohols and phenols: principles, terminology, representative examples, and relation to aldehydes and ketones.
Week 7	Midterm Exam + Aldehydes and ketones: key concepts, examples, and interpretation.
Week 8	Carboxylic acids and derivatives: principles, terminology, representative examples, and relation to amines and heterocycles.
Week 9	Amines and heterocycles: principles, terminology, representative examples, and relation to biologically important organic molecules.
Week 10	Biologically important organic molecules: principles, terminology, representative examples, and relation to bonding and hybridisation.
Week 11	Bonding and hybridisation: principles, terminology, representative examples, and relation to functional groups.
Week 12	Functional groups: principles, terminology, representative examples, and relation to alkanes and cycloalkanes.
Week 13	Alkanes and cycloalkanes: principles, terminology, representative examples, and relation to alkenes and alkynes.
Week 14	Alkenes and alkynes: principles, terminology, representative examples, and relation to aromatic compounds.
Week 15	Integration and revision: applications of aromatic compounds, alcohols and phenols, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Organic Chemistry.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to bonding and hybridisation; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to functional groups; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to alkanes and cycloalkanes; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to alkenes and alkynes; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to aromatic compounds; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to alcohols and phenols; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to aldehydes and ketones; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to carboxylic acids and derivatives; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to amines and heterocycles; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to biologically important organic molecules; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to bonding and hybridisation; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to functional groups; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to alkanes and cycloalkanes; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to alkenes and alkynes; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Skoog, D.A. et al. Principles of Instrumental Analysis / Analytical Chemistry texts.	Yes
Recommended Texts	Selected recent review articles and laboratory manuals approved by the department.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Biostatistics احصاء حياتي		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [ ] Lab [X] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-1209		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	UGI	Semester of Delivery	2
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	حسن محمد زيدان	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Assistant Lecturer	Module Leader's Qualification	M.Sc.
Module Tutor (1) Name	Name [يحتاج تعبئة من القسم العلمي]	Acad. Title / Qualification	Academic Title / Qualification
Module Tutor (2) Name	Name [يحتاج تعبئة من القسم العلمي]	Acad. Title / Qualification	Academic Title / Qualification
Module Tutor (3) Name	Name [يحتاج تعبئة من القسم العلمي]	Acad. Title / Qualification	Academic Title / Qualification
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Biostatistics and its relevance to Life Sciences. 2. To explain the key principles related to data types and variables, sampling and study design, and descriptive statistics. 3. To develop the ability to connect theoretical concepts of Biostatistics with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Biostatistics. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Biostatistics.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Biostatistics (Remember). 2. Describe the main concepts of data types and variables and sampling and study design (Understand). 3. Explain the biological significance of descriptive statistics and probability concepts (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Biostatistics (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to normal distribution (Apply). 6. Compare selected examples, methods, or biological systems within Biostatistics (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Biostatistics (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Biostatistics in health, environment,

	biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Biostatistics (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Data types and variables: Concepts, terminology, mechanisms, representative examples, and applications related to sampling and study design. [SSWL = 12 hrs] Unit 2 — Descriptive statistics: Concepts, terminology, mechanisms, representative examples, and applications related to probability concepts. [SSWL = 12 hrs] Unit 3 — Normal distribution: Concepts, terminology, mechanisms, representative examples, and applications related to confidence intervals. [SSWL = 12 hrs] Unit 4 — Hypothesis testing: Concepts, terminology, mechanisms, representative examples, and applications related to t-test and chi-square. [SSWL = 11 hrs] Unit 5 — Correlation and regression: Concepts, terminology, mechanisms, representative examples, and applications related to ANOVA and biological interpretation. [SSWL = 11 hrs] Unit 6 — Data types and variables: Concepts, terminology, mechanisms, representative examples, and applications related to sampling and study design. [SSWL = 11 hrs] Unit 7 — Descriptive statistics: Concepts, terminology, mechanisms, representative examples, and applications related to probability concepts. [SSWL = 11 hrs] Total Structured SWL = 80 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs lectures, directed reading, classroom discussion, short assignments, and applied examples. Teaching focuses on building conceptual understanding of Biostatistics, improving academic communication, and linking the subject to the wider Life Sciences curriculum. Students are encouraged to participate actively, complete weekly tasks, and use feedback to improve written and oral performance.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	80	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	70	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Data types and variables: principles, terminology, representative examples, and relation to sampling and study design.
Week 2	Sampling and study design: principles, terminology, representative examples, and relation to descriptive statistics.
Week 3	Descriptive statistics: principles, terminology, representative examples, and relation to probability concepts.
Week 4	Probability concepts: principles, terminology, representative

	examples, and relation to normal distribution.
Week 5	Normal distribution: principles, terminology, representative examples, and relation to confidence intervals.
Week 6	Confidence intervals: principles, terminology, representative examples, and relation to hypothesis testing.
Week 7	Midterm Exam + Hypothesis testing: key concepts, examples, and interpretation.
Week 8	T-test and chi-square: principles, terminology, representative examples, and relation to correlation and regression.
Week 9	Correlation and regression: principles, terminology, representative examples, and relation to ANOVA and biological interpretation.
Week 10	Anova and biological interpretation: principles, terminology, representative examples, and relation to data types and variables.
Week 11	Data types and variables: principles, terminology, representative examples, and relation to sampling and study design.
Week 12	Sampling and study design: principles, terminology, representative examples, and relation to descriptive statistics.
Week 13	Descriptive statistics: principles, terminology, representative examples, and relation to probability concepts.
Week 14	Probability concepts: principles, terminology, representative examples, and relation to normal distribution.
Week 15	Integration and revision: applications of normal distribution, confidence intervals, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 2	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 3	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 4	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 5	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 6	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 7	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 8	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 9	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 10	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 11	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 12	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 13	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 14	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 15	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 16	Not applicable: this module is delivered without a scheduled laboratory component.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Course notes prepared by the Department of Life Sciences and an approved recent textbook in the field.	Yes
Recommended Texts	Recent peer-reviewed articles, laboratory manuals, and open educational resources relevant to the module.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Safety and bioscurity السلامة والامن البايلوجي		Module Delivery
Module Type	Basic		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-12010		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGI	Semester of Delivery	2
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	شيماء فاتح علي	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	يوسف نزال هوسي	Acad. Title / Qualification	Lecturer / M.Sc.
Module Tutor (2) Name	Name [يحتاج تعبئة من القسم العلمي]	Acad. Title / Qualification	Academic Title / Qualification
Module Tutor (3) Name	Name [يحتاج تعبئة من القسم العلمي]	Acad. Title / Qualification	Academic Title / Qualification
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Safety and bioscurity and its relevance to Life Sciences. 2. To explain the key principles related to biosafety and biosecurity concepts, risk assessment, and personal protective equipment. 3. To develop the ability to connect theoretical concepts of Safety and bioscurity with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Safety and bioscurity. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Safety and bioscurity.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Safety and bioscurity (Remember). 2. Describe the main concepts of biosafety and biosecurity concepts and risk assessment (Understand). 3. Explain the biological significance of personal protective equipment and sterilisation and disinfection (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Safety and bioscurity (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to biological waste management (Apply). 6. Compare selected examples, methods, or biological systems within Safety and bioscurity (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Safety and bioscurity (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Safety and bioscurity in health,

	environment, biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Safety and bioscurity (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Biosafety and biosecurity concepts: Concepts, terminology, mechanisms, representative examples, and applications related to risk assessment. [SSWL = 12 hrs] Unit 2 — Personal protective equipment: Concepts, terminology, mechanisms, representative examples, and applications related to sterilisation and disinfection. [SSWL = 12 hrs] Unit 3 — Biological waste management: Concepts, terminology, mechanisms, representative examples, and applications related to chemical safety. [SSWL = 12 hrs] Unit 4 — Biosafety cabinets: Concepts, terminology, mechanisms, representative examples, and applications related to incident reporting. [SSWL = 11 hrs] Unit 5 — Infection control: Concepts, terminology, mechanisms, representative examples, and applications related to laboratory quality culture. [SSWL = 11 hrs] Unit 6 — Biosafety and biosecurity concepts: Concepts, terminology, mechanisms, representative examples, and applications related to risk assessment. [SSWL = 11 hrs] Unit 7 — Personal protective equipment: Concepts, terminology, mechanisms, representative examples, and applications related to sterilisation and disinfection. [SSWL = 11 hrs] Total Structured SWL = 80 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Safety and bioscurity using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	80	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	45	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Biosafety and biosecurity concepts: principles, terminology, representative examples, and relation to risk assessment.
Week 2	Risk assessment: principles, terminology, representative examples, and relation to personal protective equipment.
Week 3	Personal protective equipment: principles, terminology, representative examples, and relation to sterilisation and disinfection.

Week 4	Sterilisation and disinfection: principles, terminology, representative examples, and relation to biological waste management.
Week 5	Biological waste management: principles, terminology, representative examples, and relation to chemical safety.
Week 6	Chemical safety: principles, terminology, representative examples, and relation to biosafety cabinets.
Week 7	Midterm Exam + Biosafety cabinets: key concepts, examples, and interpretation.
Week 8	Incident reporting: principles, terminology, representative examples, and relation to infection control.
Week 9	Infection control: principles, terminology, representative examples, and relation to laboratory quality culture.
Week 10	Laboratory quality culture: principles, terminology, representative examples, and relation to biosafety and biosecurity concepts.
Week 11	Biosafety and biosecurity concepts: principles, terminology, representative examples, and relation to risk assessment.
Week 12	Risk assessment: principles, terminology, representative examples, and relation to personal protective equipment.
Week 13	Personal protective equipment: principles, terminology, representative examples, and relation to sterilisation and disinfection.
Week 14	Sterilisation and disinfection: principles, terminology, representative examples, and relation to biological waste management.
Week 15	Integration and revision: applications of biological waste management, chemical safety, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Safety and bioscurity.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to biosafety and biosecurity concepts; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to risk assessment; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to personal protective equipment; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to sterilisation and disinfection; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to biological waste management; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to chemical safety; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to biosafety cabinets; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to incident reporting; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to infection control; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to laboratory quality culture; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to biosafety and biosecurity concepts; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to risk assessment; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to personal protective equipment; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to sterilisation and disinfection; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Course notes prepared by the Department of Life Sciences and an approved recent textbook in the field.	Yes
Recommended Texts	Recent peer-reviewed articles, laboratory manuals, and open educational resources relevant to the module.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Computer Science علم الحاسوب		Module Delivery
Module Type	Basic		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [ ] Seminar
Module Code	UNI-12011		
ECTS Credits	3		
SWL (hr/sem)	75		
Module Level	UGI	Semester of Delivery	2
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	ازهر محمود	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Assistant Lecturer	Module Leader's Qualification	M.Sc.
Module Tutor (1) Name	حسن محمد زيدان	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Module Tutor (2) Name	مهند احمد جاسم	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Module Tutor (3) Name	Name [يحتاج تعبئة من القسم العلمي]	Acad. Title / Qualification	Academic Title / Qualification
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Computer Science and its relevance to Life Sciences. 2. To explain the key principles related to computer hardware and software, operating systems, and word processing. 3. To develop the ability to connect theoretical concepts of Computer Science with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Computer Science. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Computer Science.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Computer Science (Remember). 2. Describe the main concepts of computer hardware and software and operating systems (Understand). 3. Explain the biological significance of word processing and spreadsheets and data handling (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Computer Science (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to presentation software (Apply). 6. Compare selected examples, methods, or biological systems within Computer Science (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Computer Science (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Computer Science in health,

	environment, biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Computer Science (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Computer hardware and software: Concepts, terminology, mechanisms, representative examples, and applications related to operating systems. [SSWL = 10 hrs] Unit 2 — Word processing: Concepts, terminology, mechanisms, representative examples, and applications related to spreadsheets and data handling. [SSWL = 10 hrs] Unit 3 — Presentation software: Concepts, terminology, mechanisms, representative examples, and applications related to internet and academic search. [SSWL = 9 hrs] Unit 4 — Database concepts: Concepts, terminology, mechanisms, representative examples, and applications related to basic programming logic. [SSWL = 9 hrs] Unit 5 — Cybersecurity awareness: Concepts, terminology, mechanisms, representative examples, and applications related to bioinformatics introduction. [SSWL = 9 hrs] Unit 6 — Computer hardware and software: Concepts, terminology, mechanisms, representative examples, and applications related to operating systems. [SSWL = 9 hrs] Unit 7 — Word processing: Concepts, terminology, mechanisms, representative examples, and applications related to spreadsheets and data handling. [SSWL = 9 hrs] Total Structured SWL = 65 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Computer Science using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	65	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	10	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Computer hardware and software: principles, terminology, representative examples, and relation to operating systems.
Week 2	Operating systems: principles, terminology, representative examples, and relation to word processing.
Week 3	Word processing: principles, terminology, representative examples, and relation to spreadsheets and data handling.

Week 4	Spreadsheets and data handling: principles, terminology, representative examples, and relation to presentation software.
Week 5	Presentation software: principles, terminology, representative examples, and relation to internet and academic search.
Week 6	Internet and academic search: principles, terminology, representative examples, and relation to database concepts.
Week 7	Midterm Exam + Database concepts: key concepts, examples, and interpretation.
Week 8	Basic programming logic: principles, terminology, representative examples, and relation to cybersecurity awareness.
Week 9	Cybersecurity awareness: principles, terminology, representative examples, and relation to bioinformatics introduction.
Week 10	Bioinformatics introduction: principles, terminology, representative examples, and relation to computer hardware and software.
Week 11	Computer hardware and software: principles, terminology, representative examples, and relation to operating systems.
Week 12	Operating systems: principles, terminology, representative examples, and relation to word processing.
Week 13	Word processing: principles, terminology, representative examples, and relation to spreadsheets and data handling.
Week 14	Spreadsheets and data handling: principles, terminology, representative examples, and relation to presentation software.
Week 15	Integration and revision: applications of presentation software, internet and academic search, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Computer Science.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to computer hardware and software; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to operating systems; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to word processing; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to spreadsheets and data handling; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to presentation software; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to internet and academic search; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to database concepts; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to basic programming logic; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to cybersecurity awareness; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to bioinformatics introduction; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to computer hardware and software; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to operating systems; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to word processing; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to spreadsheets and data handling; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Course notes prepared by the Department of Life Sciences and an approved recent textbook in the field.	Yes
Recommended Texts	Recent peer-reviewed articles, laboratory manuals, and open educational resources relevant to the module.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	English Language اللغة الانكليزية		Module Delivery
Module Type	Basic		[X] Theory [X] Lecture [ ] Lab [ ] Tutorial [ ] Practical [ ] Seminar
Module Code	UNI-12012		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	UGI	Semester of Delivery	2
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	مالك زيدان	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Assistant Lecturer	Module Leader's Qualification	M.Sc.
Module Tutor (1) Name	مهند احمد جاسم	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Module Tutor (2) Name	Name [يحتاج تعبئة من القسم العلمي]	Acad. Title / Qualification	Academic Title / Qualification
Module Tutor (3) Name	Name [يحتاج تعبئة من القسم العلمي]	Acad. Title / Qualification	Academic Title / Qualification
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of English Language and its relevance to Life Sciences. 2. To explain the key principles related to academic vocabulary, reading scientific texts, and grammar for academic writing. 3. To develop the ability to connect theoretical concepts of English Language with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to English Language. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of English Language.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of English Language (Remember). 2. Describe the main concepts of academic vocabulary and reading scientific texts (Understand). 3. Explain the biological significance of grammar for academic writing and paragraph writing (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with English Language (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to listening and speaking skills (Apply). 6. Compare selected examples, methods, or biological systems within English Language (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of English Language (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of English Language in health,

	environment, biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in English Language (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Academic vocabulary: Concepts, terminology, mechanisms, representative examples, and applications related to reading scientific texts. [SSWL = 5 hrs] Unit 2 — Grammar for academic writing: Concepts, terminology, mechanisms, representative examples, and applications related to paragraph writing. [SSWL = 5 hrs] Unit 3 — Listening and speaking skills: Concepts, terminology, mechanisms, representative examples, and applications related to scientific terminology. [SSWL = 5 hrs] Unit 4 — Summarising and paraphrasing: Concepts, terminology, mechanisms, representative examples, and applications related to presentation skills. [SSWL = 5 hrs] Unit 5 — Email and report writing: Concepts, terminology, mechanisms, representative examples, and applications related to academic vocabulary. [SSWL = 5 hrs] Unit 6 — Reading scientific texts: Concepts, terminology, mechanisms, representative examples, and applications related to grammar for academic writing. [SSWL = 4 hrs] Unit 7 — Paragraph writing: Concepts, terminology, mechanisms, representative examples, and applications related to listening and speaking skills. [SSWL = 4 hrs] Total Structured SWL = 33 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs lectures, directed reading, classroom discussion, short assignments, and applied examples. Teaching focuses on building conceptual understanding of English Language, improving academic communication, and linking the subject to the wider Life Sciences curriculum. Students are encouraged to participate actively, complete weekly tasks, and use feedback to improve written and oral performance.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Academic vocabulary: principles, terminology, representative examples, and relation to reading scientific texts.
Week 2	Reading scientific texts: principles, terminology, representative examples, and relation to grammar for academic writing.
Week 3	Grammar for academic writing: principles, terminology, representative examples, and relation to paragraph writing.
Week 4	Paragraph writing: principles, terminology, representative examples,

	and relation to listening and speaking skills.
Week 5	Listening and speaking skills: principles, terminology, representative examples, and relation to scientific terminology.
Week 6	Scientific terminology: principles, terminology, representative examples, and relation to summarising and paraphrasing.
Week 7	Midterm Exam + Summarising and paraphrasing: key concepts, examples, and interpretation.
Week 8	Presentation skills: principles, terminology, representative examples, and relation to email and report writing.
Week 9	Email and report writing: principles, terminology, representative examples, and relation to academic vocabulary.
Week 10	Academic vocabulary: principles, terminology, representative examples, and relation to reading scientific texts.
Week 11	Reading scientific texts: principles, terminology, representative examples, and relation to grammar for academic writing.
Week 12	Grammar for academic writing: principles, terminology, representative examples, and relation to paragraph writing.
Week 13	Paragraph writing: principles, terminology, representative examples, and relation to listening and speaking skills.
Week 14	Listening and speaking skills: principles, terminology, representative examples, and relation to scientific terminology.
Week 15	Integration and revision: applications of scientific terminology, summarising and paraphrasing, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 2	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 3	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 4	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 5	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 6	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 7	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 8	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 9	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 10	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 11	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 12	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 13	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 14	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 15	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 16	Not applicable: this module is delivered without a scheduled laboratory component.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Course notes prepared by the Department of Life Sciences and an approved recent textbook in the field.	Yes
Recommended Texts	Recent peer-reviewed articles, laboratory manuals, and open educational resources relevant to the module.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Biochemistry I كيمياء حياتية		Module Delivery
Module Type	Basic		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [ ] Seminar
Module Code	Bio-23013		
ECTS Credits	3		
SWL (hr/sem)	75		
Module Level	UGII	Semester of Delivery	3
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	هبه حمزه	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	خزعل حمد ندا	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Module Tutor (2) Name	Name [يحتاج تعبئة من القسم العلمي]	Acad. Title / Qualification	Academic Title / Qualification
Module Tutor (3) Name	Name [يحتاج تعبئة من القسم العلمي]	Acad. Title / Qualification	Academic Title / Qualification
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Biochemistry I and its relevance to Life Sciences. 2. To explain the key principles related to water, pH and buffers, carbohydrate chemistry, and lipids and membranes. 3. To develop the ability to connect theoretical concepts of Biochemistry I with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Biochemistry I. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Biochemistry I.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Biochemistry I (Remember). 2. Describe the main concepts of water, pH and buffers and carbohydrate chemistry (Understand). 3. Explain the biological significance of lipids and membranes and amino acids and proteins (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Biochemistry I (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to enzymes and kinetics (Apply). 6. Compare selected examples, methods, or biological systems within Biochemistry I (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Biochemistry I (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Biochemistry I in health, environment,

	biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Biochemistry I (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Water, ph and buffers: Concepts, terminology, mechanisms, representative examples, and applications related to carbohydrate chemistry. [SSWL = 9 hrs] Unit 2 — Lipids and membranes: Concepts, terminology, mechanisms, representative examples, and applications related to amino acids and proteins. [SSWL = 9 hrs] Unit 3 — Enzymes and kinetics: Concepts, terminology, mechanisms, representative examples, and applications related to vitamins and coenzymes. [SSWL = 9 hrs] Unit 4 — Nucleic acids: Concepts, terminology, mechanisms, representative examples, and applications related to bioenergetics. [SSWL = 9 hrs] Unit 5 — Metabolic overview: Concepts, terminology, mechanisms, representative examples, and applications related to biochemical laboratory methods. [SSWL = 9 hrs] Unit 6 — Water, ph and buffers: Concepts, terminology, mechanisms, representative examples, and applications related to carbohydrate chemistry. [SSWL = 9 hrs] Unit 7 — Lipids and membranes: Concepts, terminology, mechanisms, representative examples, and applications related to amino acids and proteins. [SSWL = 9 hrs] Total Structured SWL = 63 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Biochemistry I using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	12	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Water, ph and buffers: principles, terminology, representative examples, and relation to carbohydrate chemistry.
Week 2	Carbohydrate chemistry: principles, terminology, representative examples, and relation to lipids and membranes.
Week 3	Lipids and membranes: principles, terminology, representative examples, and relation to amino acids and proteins.

Week 4	Amino acids and proteins: principles, terminology, representative examples, and relation to enzymes and kinetics.
Week 5	Enzymes and kinetics: principles, terminology, representative examples, and relation to vitamins and coenzymes.
Week 6	Vitamins and coenzymes: principles, terminology, representative examples, and relation to nucleic acids.
Week 7	Midterm Exam + Nucleic acids: key concepts, examples, and interpretation.
Week 8	Bioenergetics: principles, terminology, representative examples, and relation to metabolic overview.
Week 9	Metabolic overview: principles, terminology, representative examples, and relation to biochemical laboratory methods.
Week 10	Biochemical laboratory methods: principles, terminology, representative examples, and relation to water, pH and buffers.
Week 11	Water, ph and buffers: principles, terminology, representative examples, and relation to carbohydrate chemistry.
Week 12	Carbohydrate chemistry: principles, terminology, representative examples, and relation to lipids and membranes.
Week 13	Lipids and membranes: principles, terminology, representative examples, and relation to amino acids and proteins.
Week 14	Amino acids and proteins: principles, terminology, representative examples, and relation to enzymes and kinetics.
Week 15	Integration and revision: applications of enzymes and kinetics, vitamins and coenzymes, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Biochemistry I.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to water, pH and buffers; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to carbohydrate chemistry; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to lipids and membranes; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to amino acids and proteins; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to enzymes and kinetics; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to vitamins and coenzymes; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to nucleic acids; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to bioenergetics; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to metabolic overview; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to biochemical laboratory methods; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to water, pH and buffers; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to carbohydrate chemistry; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to lipids and membranes; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to amino acids and proteins; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Nelson, D.L. & Cox, M.M. Lehninger Principles of Biochemistry.	Yes
Recommended Texts	Berg, Tymoczko & Stryer. Biochemistry.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Plant Anatomy علم تشريح النبات		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-23014		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGII	Semester of Delivery	3
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	رنا هاشم علوش حسن	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	ايمن عدوان عبد	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (2) Name	هشام مجيد شلاش	Acad. Title / Qualification	Lecturer / Ph.D.
Module Tutor (3) Name	ايفان عبد الرحمن حمزة	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Plant Anatomy and its relevance to Life Sciences. 2. To explain the key principles related to plant cell structure, meristems, and epidermal tissue system. 3. To develop the ability to connect theoretical concepts of Plant Anatomy with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Plant Anatomy. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Plant Anatomy.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Plant Anatomy (Remember). 2. Describe the main concepts of plant cell structure and meristems (Understand). 3. Explain the biological significance of epidermal tissue system and ground tissues (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Plant Anatomy (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to vascular tissues (Apply). 6. Compare selected examples, methods, or biological systems within Plant Anatomy (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Plant Anatomy (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Plant Anatomy in health, environment,

	biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Plant Anatomy (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Plant cell structure: Concepts, terminology, mechanisms, representative examples, and applications related to meristems. [SSWL = 12 hrs] Unit 2 — Epidermal tissue system: Concepts, terminology, mechanisms, representative examples, and applications related to ground tissues. [SSWL = 12 hrs] Unit 3 — Vascular tissues: Concepts, terminology, mechanisms, representative examples, and applications related to root anatomy. [SSWL = 11 hrs] Unit 4 — Stem anatomy: Concepts, terminology, mechanisms, representative examples, and applications related to leaf anatomy. [SSWL = 11 hrs] Unit 5 — Secondary growth: Concepts, terminology, mechanisms, representative examples, and applications related to anatomical adaptation. [SSWL = 11 hrs] Unit 6 — Plant cell structure: Concepts, terminology, mechanisms, representative examples, and applications related to meristems. [SSWL = 11 hrs] Unit 7 — Epidermal tissue system: Concepts, terminology, mechanisms, representative examples, and applications related to ground tissues. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Plant Anatomy using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Plant cell structure: principles, terminology, representative examples, and relation to meristems.
Week 2	Meristems: principles, terminology, representative examples, and relation to epidermal tissue system.
Week 3	Epidermal tissue system: principles, terminology, representative examples, and relation to ground tissues.

Week 4	Ground tissues: principles, terminology, representative examples, and relation to vascular tissues.
Week 5	Vascular tissues: principles, terminology, representative examples, and relation to root anatomy.
Week 6	Root anatomy: principles, terminology, representative examples, and relation to stem anatomy.
Week 7	Midterm Exam + Stem anatomy: key concepts, examples, and interpretation.
Week 8	Leaf anatomy: principles, terminology, representative examples, and relation to secondary growth.
Week 9	Secondary growth: principles, terminology, representative examples, and relation to anatomical adaptation.
Week 10	Anatomical adaptation: principles, terminology, representative examples, and relation to plant cell structure.
Week 11	Plant cell structure: principles, terminology, representative examples, and relation to meristems.
Week 12	Meristems: principles, terminology, representative examples, and relation to epidermal tissue system.
Week 13	Epidermal tissue system: principles, terminology, representative examples, and relation to ground tissues.
Week 14	Ground tissues: principles, terminology, representative examples, and relation to vascular tissues.
Week 15	Integration and revision: applications of vascular tissues, root anatomy, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Plant Anatomy.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to plant cell structure; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to meristems; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to epidermal tissue system; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to ground tissues; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to vascular tissues; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to root anatomy; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to stem anatomy; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to leaf anatomy; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to secondary growth; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to anatomical adaptation; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to plant cell structure; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to meristems; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to epidermal tissue system; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to ground tissues; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?

Required Texts	Taiz et al. Plant Physiology and Development / Raven Biology of Plants.	Yes
Recommended Texts	Selected flora, taxonomy, and plant science atlases approved by the department.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Invertebrates علم اللافقريات		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-23015		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGII	Semester of Delivery	3
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	عبد الخالق علوان	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	فاطمة شهاب احمد	Acad. Title / Qualification	Professor / Ph.D.
Module Tutor (2) Name	علي محمد عبد	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (3) Name	الشيماء جاسم محمد	Acad. Title / Qualification	Lecturer / Qualification
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Invertebrates and its relevance to Life Sciences. 2. To explain the key principles related to invertebrate classification, protozoa, and Porifera. 3. To develop the ability to connect theoretical concepts of Invertebrates with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Invertebrates. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Invertebrates.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Invertebrates (Remember). 2. Describe the main concepts of invertebrate classification and protozoa (Understand). 3. Explain the biological significance of Porifera and Cnidaria (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Invertebrates (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to Platyhelminthes (Apply). 6. Compare selected examples, methods, or biological systems within Invertebrates (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Invertebrates (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Invertebrates in health, environment,

	biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Invertebrates (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Invertebrate classification: Concepts, terminology, mechanisms, representative examples, and applications related to protozoa. [SSWL = 12 hrs] Unit 2 — Porifera: Concepts, terminology, mechanisms, representative examples, and applications related to Cnidaria. [SSWL = 12 hrs] Unit 3 — Platyhelminthes: Concepts, terminology, mechanisms, representative examples, and applications related to Nematoda. [SSWL = 11 hrs] Unit 4 — Annelida: Concepts, terminology, mechanisms, representative examples, and applications related to Mollusca. [SSWL = 11 hrs] Unit 5 — Arthropoda: Concepts, terminology, mechanisms, representative examples, and applications related to Echinodermata. [SSWL = 11 hrs] Unit 6 — Invertebrate classification: Concepts, terminology, mechanisms, representative examples, and applications related to protozoa. [SSWL = 11 hrs] Unit 7 — Porifera: Concepts, terminology, mechanisms, representative examples, and applications related to Cnidaria. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Invertebrates using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Invertebrate classification: principles, terminology, representative examples, and relation to protozoa.
Week 2	Protozoa: principles, terminology, representative examples, and relation to Porifera.
Week 3	Porifera: principles, terminology, representative examples, and relation to Cnidaria.

Week 4	Cnidaria: principles, terminology, representative examples, and relation to Platyhelminthes.
Week 5	Platyhelminthes: principles, terminology, representative examples, and relation to Nematoda.
Week 6	Nematoda: principles, terminology, representative examples, and relation to Annelida.
Week 7	Midterm Exam + Annelida: key concepts, examples, and interpretation.
Week 8	Mollusca: principles, terminology, representative examples, and relation to Arthropoda.
Week 9	Arthropoda: principles, terminology, representative examples, and relation to Echinodermata.
Week 10	Echinodermata: principles, terminology, representative examples, and relation to invertebrate classification.
Week 11	Invertebrate classification: principles, terminology, representative examples, and relation to protozoa.
Week 12	Protozoa: principles, terminology, representative examples, and relation to Porifera.
Week 13	Porifera: principles, terminology, representative examples, and relation to Cnidaria.
Week 14	Cnidaria: principles, terminology, representative examples, and relation to Platyhelminthes.
Week 15	Integration and revision: applications of Platyhelminthes, Nematoda, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Invertebrates.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to invertebrate classification; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to protozoa; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to Porifera; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to Cnidaria; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to Platyhelminthes; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to Nematoda; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to Annelida; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to Mollusca; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to Arthropoda; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to Echinodermata; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to invertebrate classification; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to protozoa; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to Porifera; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to Cnidaria; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Course notes prepared by the Department of Life Sciences and an approved recent textbook in the field.	Yes
Recommended Texts	Recent peer-reviewed articles, laboratory manuals, and open educational resources relevant to the module.	No

Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Plant groups مجاميع نباتية		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-23016		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGII	Semester of Delivery	3
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	شيماء فاتح علي	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	بلال احمد عبد الله حسين	Acad. Title / Qualification	Lecturer / Ph.D.
Module Tutor (2) Name	علي عصام ممدوح علوان	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Module Tutor (3) Name	Name [يحتاج تعبئة من القسم العلمي]	Acad. Title / Qualification	Academic Title / Qualification
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Plant groups and its relevance to Life Sciences. 2. To explain the key principles related to algae, bryophytes, and pteridophytes. 3. To develop the ability to connect theoretical concepts of Plant groups with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Plant groups. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Plant groups.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Plant groups (Remember). 2. Describe the main concepts of algae and bryophytes (Understand). 3. Explain the biological significance of pteridophytes and gymnosperms (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Plant groups (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to angiosperms (Apply). 6. Compare selected examples, methods, or biological systems within Plant groups (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Plant groups (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Plant groups in health, environment, biotechnology, or biological research (Evaluate).

	10. Prepare a concise scientific report or presentation based on selected topics in Plant groups (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Algae: Concepts, terminology, mechanisms, representative examples, and applications related to bryophytes. [SSWL = 12 hrs] Unit 2 — Pteridophytes: Concepts, terminology, mechanisms, representative examples, and applications related to gymnosperms. [SSWL = 12 hrs] Unit 3 — Angiosperms: Concepts, terminology, mechanisms, representative examples, and applications related to life cycles. [SSWL = 11 hrs] Unit 4 — Reproductive structures: Concepts, terminology, mechanisms, representative examples, and applications related to ecological importance. [SSWL = 11 hrs] Unit 5 — Economic importance: Concepts, terminology, mechanisms, representative examples, and applications related to evolutionary trends. [SSWL = 11 hrs] Unit 6 — Algae: Concepts, terminology, mechanisms, representative examples, and applications related to bryophytes. [SSWL = 11 hrs] Unit 7 — Pteridophytes: Concepts, terminology, mechanisms, representative examples, and applications related to gymnosperms. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Plant groups using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Algae: principles, terminology, representative examples, and relation to bryophytes.
Week 2	Bryophytes: principles, terminology, representative examples, and relation to pteridophytes.
Week 3	Pteridophytes: principles, terminology, representative examples, and relation to gymnosperms.
Week 4	Gymnosperms: principles, terminology, representative examples, and relation to angiosperms.
Week 5	Angiosperms: principles, terminology, representative examples, and

	relation to life cycles.
Week 6	Life cycles: principles, terminology, representative examples, and relation to reproductive structures.
Week 7	Midterm Exam + Reproductive structures: key concepts, examples, and interpretation.
Week 8	Ecological importance: principles, terminology, representative examples, and relation to economic importance.
Week 9	Economic importance: principles, terminology, representative examples, and relation to evolutionary trends.
Week 10	Evolutionary trends: principles, terminology, representative examples, and relation to algae.
Week 11	Algae: principles, terminology, representative examples, and relation to bryophytes.
Week 12	Bryophytes: principles, terminology, representative examples, and relation to pteridophytes.
Week 13	Pteridophytes: principles, terminology, representative examples, and relation to gymnosperms.
Week 14	Gymnosperms: principles, terminology, representative examples, and relation to angiosperms.
Week 15	Integration and revision: applications of angiosperms, life cycles, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Plant groups.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to algae; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to bryophytes; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to pteridophytes; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to gymnosperms; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to angiosperms; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to life cycles; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to reproductive structures; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to ecological importance; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to economic importance; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to evolutionary trends; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to algae; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to bryophytes; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to pteridophytes; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to gymnosperms; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Taiz et al. Plant Physiology and Development / Raven Biology of Plants.	Yes
Recommended Texts	Selected flora, taxonomy, and plant science atlases approved by the department.	No
Websites	https://www.ncbi.nlm.nih.gov/books/	Online resources

	https://scholar.google.com https://www.khanacademy.org/science	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Entomology I علم الحشرات I		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-23017		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGII	Semester of Delivery	3
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	سعيد ماهر لفته حمدان	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	استبرق محمود مهدي	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (2) Name	راشد اسماعيل طه	Acad. Title / Qualification	Lecturer / Ph.D.
Module Tutor (3) Name	ضفاف راضي مهدي	Acad. Title / Qualification	Lecturer / M.Sc.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Entomology I and its relevance to Life Sciences. 2. To explain the key principles related to insect body plan, head and mouthparts, and thorax and appendages. 3. To develop the ability to connect theoretical concepts of Entomology I with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Entomology I. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Entomology I.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Entomology I (Remember). 2. Describe the main concepts of insect body plan and head and mouthparts (Understand). 3. Explain the biological significance of thorax and appendages and abdomen and reproduction (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Entomology I (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to insect physiology (Apply). 6. Compare selected examples, methods, or biological systems within Entomology I (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Entomology I (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Entomology I in health, environment,

	biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Entomology I (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Insect body plan: Concepts, terminology, mechanisms, representative examples, and applications related to head and mouthparts. [SSWL = 12 hrs] Unit 2 — Thorax and appendages: Concepts, terminology, mechanisms, representative examples, and applications related to abdomen and reproduction. [SSWL = 12 hrs] Unit 3 — Insect physiology: Concepts, terminology, mechanisms, representative examples, and applications related to metamorphosis. [SSWL = 11 hrs] Unit 4 — Collection and preservation: Concepts, terminology, mechanisms, representative examples, and applications related to identification characters. [SSWL = 11 hrs] Unit 5 — Ecology of insects: Concepts, terminology, mechanisms, representative examples, and applications related to introductory classification. [SSWL = 11 hrs] Unit 6 — Insect body plan: Concepts, terminology, mechanisms, representative examples, and applications related to head and mouthparts. [SSWL = 11 hrs] Unit 7 — Thorax and appendages: Concepts, terminology, mechanisms, representative examples, and applications related to abdomen and reproduction. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Entomology I using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Insect body plan: principles, terminology, representative examples, and relation to head and mouthparts.
Week 2	Head and mouthparts: principles, terminology, representative examples, and relation to thorax and appendages.
Week 3	Thorax and appendages: principles, terminology, representative examples, and relation to abdomen and reproduction.

Week 4	Abdomen and reproduction: principles, terminology, representative examples, and relation to insect physiology.
Week 5	Insect physiology: principles, terminology, representative examples, and relation to metamorphosis.
Week 6	Metamorphosis: principles, terminology, representative examples, and relation to collection and preservation.
Week 7	Midterm Exam + Collection and preservation: key concepts, examples, and interpretation.
Week 8	Identification characters: principles, terminology, representative examples, and relation to ecology of insects.
Week 9	Ecology of insects: principles, terminology, representative examples, and relation to introductory classification.
Week 10	Introductory classification: principles, terminology, representative examples, and relation to insect body plan.
Week 11	Insect body plan: principles, terminology, representative examples, and relation to head and mouthparts.
Week 12	Head and mouthparts: principles, terminology, representative examples, and relation to thorax and appendages.
Week 13	Thorax and appendages: principles, terminology, representative examples, and relation to abdomen and reproduction.
Week 14	Abdomen and reproduction: principles, terminology, representative examples, and relation to insect physiology.
Week 15	Integration and revision: applications of insect physiology, metamorphosis, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Entomology I.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to insect body plan; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to head and mouthparts; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to thorax and appendages; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to abdomen and reproduction; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to insect physiology; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to metamorphosis; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to collection and preservation; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to identification characters; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to ecology of insects; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to introductory classification; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to insect body plan; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to head and mouthparts; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to thorax and appendages; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to abdomen and reproduction; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Hickman et al. Integrated Principles of Zoology.	Yes
Recommended Texts	Relevant zoology, parasitology, and entomology atlases approved by the department.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Microbiology I علم الاحياء المجهرية I		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-23018		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGII	Semester of Delivery	3
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	سهى ماهر عبد الرشيد	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	بشرى علي كاظم	Acad. Title / Qualification	Assistant Professor / Qualification
Module Tutor (2) Name	دنيا كمال سالم	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (3) Name	فاطمة مصطفى مهدي	Acad. Title / Qualification	Lecturer / Ph.D.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Microbiology I and its relevance to Life Sciences. 2. To explain the key principles related to history of microbiology, microscopy and staining, and bacterial cell structure. 3. To develop the ability to connect theoretical concepts of Microbiology I with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Microbiology I. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Microbiology I.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Microbiology I (Remember). 2. Describe the main concepts of history of microbiology and microscopy and staining (Understand). 3. Explain the biological significance of bacterial cell structure and microbial nutrition (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Microbiology I (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to growth and culture media (Apply). 6. Compare selected examples, methods, or biological systems within Microbiology I (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Microbiology I (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Microbiology I in health, environment,

	biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Microbiology I (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — History of microbiology: Concepts, terminology, mechanisms, representative examples, and applications related to microscopy and staining. [SSWL = 12 hrs] Unit 2 — Bacterial cell structure: Concepts, terminology, mechanisms, representative examples, and applications related to microbial nutrition. [SSWL = 12 hrs] Unit 3 — Growth and culture media: Concepts, terminology, mechanisms, representative examples, and applications related to sterilisation and disinfection. [SSWL = 11 hrs] Unit 4 — Microbial metabolism: Concepts, terminology, mechanisms, representative examples, and applications related to microbial genetics introduction. [SSWL = 11 hrs] Unit 5 — Fungi and yeasts: Concepts, terminology, mechanisms, representative examples, and applications related to viruses introduction. [SSWL = 11 hrs] Unit 6 — History of microbiology: Concepts, terminology, mechanisms, representative examples, and applications related to microscopy and staining. [SSWL = 11 hrs] Unit 7 — Bacterial cell structure: Concepts, terminology, mechanisms, representative examples, and applications related to microbial nutrition. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Microbiology I using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	History of microbiology: principles, terminology, representative examples, and relation to microscopy and staining.
Week 2	Microscopy and staining: principles, terminology, representative examples, and relation to bacterial cell structure.
Week 3	Bacterial cell structure: principles, terminology, representative examples, and relation to microbial nutrition.

Week 4	Microbial nutrition: principles, terminology, representative examples, and relation to growth and culture media.
Week 5	Growth and culture media: principles, terminology, representative examples, and relation to sterilisation and disinfection.
Week 6	Sterilisation and disinfection: principles, terminology, representative examples, and relation to microbial metabolism.
Week 7	Midterm Exam + Microbial metabolism: key concepts, examples, and interpretation.
Week 8	Microbial genetics introduction: principles, terminology, representative examples, and relation to fungi and yeasts.
Week 9	Fungi and yeasts: principles, terminology, representative examples, and relation to viruses introduction.
Week 10	Viruses introduction: principles, terminology, representative examples, and relation to history of microbiology.
Week 11	History of microbiology: principles, terminology, representative examples, and relation to microscopy and staining.
Week 12	Microscopy and staining: principles, terminology, representative examples, and relation to bacterial cell structure.
Week 13	Bacterial cell structure: principles, terminology, representative examples, and relation to microbial nutrition.
Week 14	Microbial nutrition: principles, terminology, representative examples, and relation to growth and culture media.
Week 15	Integration and revision: applications of growth and culture media, sterilisation and disinfection, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Microbiology I.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to history of microbiology; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to microscopy and staining; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to bacterial cell structure; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to microbial nutrition; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to growth and culture media; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to sterilisation and disinfection; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to microbial metabolism; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to microbial genetics introduction; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to fungi and yeasts; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to viruses introduction; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to history of microbiology; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to microscopy and staining; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to bacterial cell structure; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to microbial nutrition; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Madigan et al. Brock Biology of Microorganisms.	Yes
Recommended Texts	Tortora, Funke & Case. Microbiology: An Introduction.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Crimes of the Baath party جرائم حزب البعث		Module Delivery
Module Type	Basic		[X] Theory [X] Lecture [ ] Lab [ ] Tutorial [ ] Practical [ ] Seminar
Module Code	UNI-23019		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	UGII	Semester of Delivery	3
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	رائد خليل ابراهيم	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	M.Sc.
Module Tutor (1) Name	Name [يحتاج تعبئة من القسم العلمي]	Acad. Title / Qualification	Academic Title / Qualification
Module Tutor (2) Name	Name [يحتاج تعبئة من القسم العلمي]	Acad. Title / Qualification	Academic Title / Qualification
Module Tutor (3) Name	Name [يحتاج تعبئة من القسم العلمي]	Acad. Title / Qualification	Academic Title / Qualification
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Crimes of the Baath party and its relevance to Life Sciences. 2. To explain the key principles related to historical background, legal documentation of crimes, and human rights violations. 3. To develop the ability to connect theoretical concepts of Crimes of the Baath party with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Crimes of the Baath party. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Crimes of the Baath party.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Crimes of the Baath party (Remember). 2. Describe the main concepts of historical background and legal documentation of crimes (Understand). 3. Explain the biological significance of human rights violations and mass graves and forced displacement (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Crimes of the Baath party (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to environmental and social impacts (Apply). 6. Compare selected examples, methods, or biological systems within Crimes of the Baath party (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Crimes of the Baath party (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Crimes of the Baath party in health,

	environment, biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Crimes of the Baath party (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Historical background: Concepts, terminology, mechanisms, representative examples, and applications related to legal documentation of crimes. [SSWL = 5 hrs] Unit 2 — Human rights violations: Concepts, terminology, mechanisms, representative examples, and applications related to mass graves and forced displacement. [SSWL = 5 hrs] Unit 3 — Environmental and social impacts: Concepts, terminology, mechanisms, representative examples, and applications related to transitional justice. [SSWL = 5 hrs] Unit 4 — National memory: Concepts, terminology, mechanisms, representative examples, and applications related to prevention of authoritarian violence. [SSWL = 5 hrs] Unit 5 — Academic documentation ethics: Concepts, terminology, mechanisms, representative examples, and applications related to historical background. [SSWL = 5 hrs] Unit 6 — Legal documentation of crimes: Concepts, terminology, mechanisms, representative examples, and applications related to human rights violations. [SSWL = 4 hrs] Unit 7 — Mass graves and forced displacement: Concepts, terminology, mechanisms, representative examples, and applications related to environmental and social impacts. [SSWL = 4 hrs] Total Structured SWL = 33 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs lectures, directed reading, classroom discussion, short assignments, and applied examples. Teaching focuses on building conceptual understanding of Crimes of the Baath party, improving academic communication, and linking the subject to the wider Life Sciences curriculum. Students are encouraged to participate actively, complete weekly tasks, and use feedback to improve written and oral performance.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Historical background: principles, terminology, representative examples, and relation to legal documentation of crimes.
Week 2	Legal documentation of crimes: principles, terminology, representative examples, and relation to human rights violations.
Week 3	Human rights violations: principles, terminology, representative examples, and relation to mass graves and forced displacement.
Week 4	Mass graves and forced displacement: principles, terminology,

	representative examples, and relation to environmental and social impacts.
Week 5	Environmental and social impacts: principles, terminology, representative examples, and relation to transitional justice.
Week 6	Transitional justice: principles, terminology, representative examples, and relation to national memory.
Week 7	Midterm Exam + National memory: key concepts, examples, and interpretation.
Week 8	Prevention of authoritarian violence: principles, terminology, representative examples, and relation to academic documentation ethics.
Week 9	Academic documentation ethics: principles, terminology, representative examples, and relation to historical background.
Week 10	Historical background: principles, terminology, representative examples, and relation to legal documentation of crimes.
Week 11	Legal documentation of crimes: principles, terminology, representative examples, and relation to human rights violations.
Week 12	Human rights violations: principles, terminology, representative examples, and relation to mass graves and forced displacement.
Week 13	Mass graves and forced displacement: principles, terminology, representative examples, and relation to environmental and social impacts.
Week 14	Environmental and social impacts: principles, terminology, representative examples, and relation to transitional justice.
Week 15	Integration and revision: applications of transitional justice, national memory, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 2	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 3	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 4	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 5	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 6	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 7	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 8	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 9	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 10	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 11	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 12	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 13	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 14	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 15	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 16	Not applicable: this module is delivered without a scheduled laboratory component.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Course notes prepared by the Department of Life Sciences and an approved recent textbook in the field.	Yes
Recommended Texts	Recent peer-reviewed articles, laboratory manuals, and open educational resources relevant to the module.	No
Websites	https://www.ncbi.nlm.nih.gov/books/	Online resources

	https://scholar.google.com https://www.khanacademy.org/science	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Plant Taxonomy علم تصنيف النبات		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-24121		
ECTS Credits	6		
SWL (hr/sem)	125		
Module Level	UGII	Semester of Delivery	4
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	رنا هاشم علوش حسن	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	ايمن عدوان عبد	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (2) Name	هشام مجيد شلاش	Acad. Title / Qualification	Lecturer / Ph.D.
Module Tutor (3) Name	ايفان عبد الرحمن حمزة	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Bio-23014	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. To provide students with a systematic understanding of Plant Taxonomy and its relevance to Life Sciences. 2. To explain the key principles related to principles of taxonomy, nomenclature rules, and herbarium techniques. 3. To develop the ability to connect theoretical concepts of Plant Taxonomy with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Plant Taxonomy. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Plant Taxonomy.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Plant Taxonomy (Remember). 2. Describe the main concepts of principles of taxonomy and nomenclature rules (Understand). 3. Explain the biological significance of herbarium techniques and diagnostic characters (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Plant Taxonomy (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to floral morphology (Apply). 6. Compare selected examples, methods, or biological systems within Plant Taxonomy (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Plant Taxonomy (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Plant Taxonomy in health, environment,

	biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Plant Taxonomy (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Principles of taxonomy: Concepts, terminology, mechanisms, representative examples, and applications related to nomenclature rules. [SSWL = 12 hrs] Unit 2 — Herbarium techniques: Concepts, terminology, mechanisms, representative examples, and applications related to diagnostic characters. [SSWL = 12 hrs] Unit 3 — Floral morphology: Concepts, terminology, mechanisms, representative examples, and applications related to identification keys. [SSWL = 11 hrs] Unit 4 — Major plant families: Concepts, terminology, mechanisms, representative examples, and applications related to phylogenetic approaches. [SSWL = 11 hrs] Unit 5 — Local flora documentation: Concepts, terminology, mechanisms, representative examples, and applications related to taxonomic reporting. [SSWL = 11 hrs] Unit 6 — Principles of taxonomy: Concepts, terminology, mechanisms, representative examples, and applications related to nomenclature rules. [SSWL = 11 hrs] Unit 7 — Herbarium techniques: Concepts, terminology, mechanisms, representative examples, and applications related to diagnostic characters. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Plant Taxonomy using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Principles of taxonomy: principles, terminology, representative examples, and relation to nomenclature rules.
Week 2	Nomenclature rules: principles, terminology, representative examples, and relation to herbarium techniques.
Week 3	Herbarium techniques: principles, terminology, representative examples, and relation to diagnostic characters.

Week 4	Diagnostic characters: principles, terminology, representative examples, and relation to floral morphology.
Week 5	Floral morphology: principles, terminology, representative examples, and relation to identification keys.
Week 6	Identification keys: principles, terminology, representative examples, and relation to major plant families.
Week 7	Midterm Exam + Major plant families: key concepts, examples, and interpretation.
Week 8	Phylogenetic approaches: principles, terminology, representative examples, and relation to local flora documentation.
Week 9	Local flora documentation: principles, terminology, representative examples, and relation to taxonomic reporting.
Week 10	Taxonomic reporting: principles, terminology, representative examples, and relation to principles of taxonomy.
Week 11	Principles of taxonomy: principles, terminology, representative examples, and relation to nomenclature rules.
Week 12	Nomenclature rules: principles, terminology, representative examples, and relation to herbarium techniques.
Week 13	Herbarium techniques: principles, terminology, representative examples, and relation to diagnostic characters.
Week 14	Diagnostic characters: principles, terminology, representative examples, and relation to floral morphology.
Week 15	Integration and revision: applications of floral morphology, identification keys, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Plant Taxonomy.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to principles of taxonomy; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to nomenclature rules; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to herbarium techniques; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to diagnostic characters; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to floral morphology; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to identification keys; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to major plant families; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to phylogenetic approaches; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to local flora documentation; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to taxonomic reporting; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to principles of taxonomy; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to nomenclature rules; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to herbarium techniques; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to diagnostic characters; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Judd et al. Plant Systematics: A Phylogenetic Approach.	Yes
Recommended Texts	Simpson, M.G. Plant Systematics.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Parasitology علم الطفيليات		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-24122		
ECTS Credits	6		
SWL (hr/sem)	125		
Module Level	UGII	Semester of Delivery	4
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	عبد الخالق علوان محيميد	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	فاطمة شهاب احمد	Acad. Title / Qualification	Professor / Ph.D.
Module Tutor (2) Name	علي محمد عبد	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (3) Name	الشيماء جاسم محمد	Acad. Title / Qualification	Lecturer / Ph.D.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Bio-23015	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. To provide students with a systematic understanding of Parasitology and its relevance to Life Sciences. 2. To explain the key principles related to host-parasite relationships, protozoan parasites, and trematodes. 3. To develop the ability to connect theoretical concepts of Parasitology with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Parasitology. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Parasitology.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Parasitology (Remember). 2. Describe the main concepts of host-parasite relationships and protozoan parasites (Understand). 3. Explain the biological significance of trematodes and cestodes (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Parasitology (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to nematodes (Apply). 6. Compare selected examples, methods, or biological systems within Parasitology (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Parasitology (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Parasitology in health, environment,

	biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Parasitology (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Host-parasite relationships: Concepts, terminology, mechanisms, representative examples, and applications related to protozoan parasites. [SSWL = 12 hrs] Unit 2 — Trematodes: Concepts, terminology, mechanisms, representative examples, and applications related to cestodes. [SSWL = 12 hrs] Unit 3 — Nematodes: Concepts, terminology, mechanisms, representative examples, and applications related to arthropod vectors. [SSWL = 11 hrs] Unit 4 — Parasite life cycles: Concepts, terminology, mechanisms, representative examples, and applications related to diagnostic methods. [SSWL = 11 hrs] Unit 5 — Control and prevention: Concepts, terminology, mechanisms, representative examples, and applications related to public health significance. [SSWL = 11 hrs] Unit 6 — Host-parasite relationships: Concepts, terminology, mechanisms, representative examples, and applications related to protozoan parasites. [SSWL = 11 hrs] Unit 7 — Trematodes: Concepts, terminology, mechanisms, representative examples, and applications related to cestodes. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Parasitology using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Host-parasite relationships: principles, terminology, representative examples, and relation to protozoan parasites.
Week 2	Protozoan parasites: principles, terminology, representative examples, and relation to trematodes.
Week 3	Trematodes: principles, terminology, representative examples, and relation to cestodes.

Week 4	Cestodes: principles, terminology, representative examples, and relation to nematodes.
Week 5	Nematodes: principles, terminology, representative examples, and relation to arthropod vectors.
Week 6	Arthropod vectors: principles, terminology, representative examples, and relation to parasite life cycles.
Week 7	Midterm Exam + Parasite life cycles: key concepts, examples, and interpretation.
Week 8	Diagnostic methods: principles, terminology, representative examples, and relation to control and prevention.
Week 9	Control and prevention: principles, terminology, representative examples, and relation to public health significance.
Week 10	Public health significance: principles, terminology, representative examples, and relation to host-parasite relationships.
Week 11	Host-parasite relationships: principles, terminology, representative examples, and relation to protozoan parasites.
Week 12	Protozoan parasites: principles, terminology, representative examples, and relation to trematodes.
Week 13	Trematodes: principles, terminology, representative examples, and relation to cestodes.
Week 14	Cestodes: principles, terminology, representative examples, and relation to nematodes.
Week 15	Integration and revision: applications of nematodes, arthropod vectors, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Parasitology.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to host-parasite relationships; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to protozoan parasites; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to trematodes; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to cestodes; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to nematodes; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to arthropod vectors; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to parasite life cycles; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to diagnostic methods; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to control and prevention; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to public health significance; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to host-parasite relationships; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to protozoan parasites; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to trematodes; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to cestodes; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Roberts, L.S. & Janovy, J. Foundations of	Yes

	Parasitology.	
Recommended Texts	Garcia, L.S. Diagnostic Medical Parasitology.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Entomology II علم الحشرات II		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-24123		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGII	Semester of Delivery	4
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	احمد علي عيسى	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	سعيد ماهر لفته حمدان	Acad. Title / Qualification	Professor / Ph.D.
Module Tutor (2) Name	استبرق محمود مهدي	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (3) Name	علي حسين	Acad. Title / Qualification	Assistant Professor / Ph.D.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Bio-23017	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. To provide students with a systematic understanding of Entomology II and its relevance to Life Sciences. 2. To explain the key principles related to advanced insect classification, orders of insects, and medical insects. 3. To develop the ability to connect theoretical concepts of Entomology II with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Entomology II. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Entomology II.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Entomology II (Remember). 2. Describe the main concepts of advanced insect classification and orders of insects (Understand). 3. Explain the biological significance of medical insects and agricultural pests (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Entomology II (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to vector biology (Apply). 6. Compare selected examples, methods, or biological systems within Entomology II (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Entomology II (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Entomology II in health, environment,

	biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Entomology II (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Advanced insect classification: Concepts, terminology, mechanisms, representative examples, and applications related to orders of insects. [SSWL = 12 hrs] Unit 2 — Medical insects: Concepts, terminology, mechanisms, representative examples, and applications related to agricultural pests. [SSWL = 12 hrs] Unit 3 — Vector biology: Concepts, terminology, mechanisms, representative examples, and applications related to insect ecology. [SSWL = 11 hrs] Unit 4 — Insect control: Concepts, terminology, mechanisms, representative examples, and applications related to integrated pest management. [SSWL = 11 hrs] Unit 5 — Beneficial insects: Concepts, terminology, mechanisms, representative examples, and applications related to field survey methods. [SSWL = 11 hrs] Unit 6 — Advanced insect classification: Concepts, terminology, mechanisms, representative examples, and applications related to orders of insects. [SSWL = 11 hrs] Unit 7 — Medical insects: Concepts, terminology, mechanisms, representative examples, and applications related to agricultural pests. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Entomology II using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Advanced insect classification: principles, terminology, representative examples, and relation to orders of insects.
Week 2	Orders of insects: principles, terminology, representative examples, and relation to medical insects.
Week 3	Medical insects: principles, terminology, representative examples, and relation to agricultural pests.

Week 4	Agricultural pests: principles, terminology, representative examples, and relation to vector biology.
Week 5	Vector biology: principles, terminology, representative examples, and relation to insect ecology.
Week 6	Insect ecology: principles, terminology, representative examples, and relation to insect control.
Week 7	Midterm Exam + Insect control: key concepts, examples, and interpretation.
Week 8	Integrated pest management: principles, terminology, representative examples, and relation to beneficial insects.
Week 9	Beneficial insects: principles, terminology, representative examples, and relation to field survey methods.
Week 10	Field survey methods: principles, terminology, representative examples, and relation to advanced insect classification.
Week 11	Advanced insect classification: principles, terminology, representative examples, and relation to orders of insects.
Week 12	Orders of insects: principles, terminology, representative examples, and relation to medical insects.
Week 13	Medical insects: principles, terminology, representative examples, and relation to agricultural pests.
Week 14	Agricultural pests: principles, terminology, representative examples, and relation to vector biology.
Week 15	Integration and revision: applications of vector biology, insect ecology, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Entomology II.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to advanced insect classification; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to orders of insects; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to medical insects; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to agricultural pests; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to vector biology; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to insect ecology; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to insect control; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to integrated pest management; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to beneficial insects; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to field survey methods; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to advanced insect classification; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to orders of insects; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to medical insects; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to agricultural pests; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Hickman et al. Integrated Principles of Zoology.	Yes
Recommended Texts	Relevant zoology, parasitology, and entomology atlases approved by the department.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Microbiology II علم الاحياء المجهرية II		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-24124		
ECTS Credits	6		
SWL (hr/sem)	125		
Module Level	UGII	Semester of Delivery	4
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	سهى ماهر عبد الرشيد	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	محمد نظير معروف	Acad. Title / Qualification	Professor / Ph.D.
Module Tutor (2) Name	ابراهيم عبدالرحمن الطيف	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (3) Name	بشرى علي كاظم	Acad. Title / Qualification	Assistant Professor / Ph.D.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Bio-23018	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. To provide students with a systematic understanding of Microbiology II and its relevance to Life Sciences. 2. To explain the key principles related to microbial metabolism, microbial genetics, and bacterial physiology. 3. To develop the ability to connect theoretical concepts of Microbiology II with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Microbiology II. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Microbiology II.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Microbiology II (Remember). 2. Describe the main concepts of microbial metabolism and microbial genetics (Understand). 3. Explain the biological significance of bacterial physiology and microbial ecology (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Microbiology II (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to pathogenesis (Apply). 6. Compare selected examples, methods, or biological systems within Microbiology II (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Microbiology II (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Microbiology II in health, environment,

	biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Microbiology II (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Microbial metabolism: Concepts, terminology, mechanisms, representative examples, and applications related to microbial genetics. [SSWL = 12 hrs] Unit 2 — Bacterial physiology: Concepts, terminology, mechanisms, representative examples, and applications related to microbial ecology. [SSWL = 12 hrs] Unit 3 — Pathogenesis: Concepts, terminology, mechanisms, representative examples, and applications related to diagnostic microbiology. [SSWL = 11 hrs] Unit 4 — Antimicrobial agents: Concepts, terminology, mechanisms, representative examples, and applications related to industrial applications. [SSWL = 11 hrs] Unit 5 — Microbial quality control: Concepts, terminology, mechanisms, representative examples, and applications related to applied microbiology. [SSWL = 11 hrs] Unit 6 — Microbial metabolism: Concepts, terminology, mechanisms, representative examples, and applications related to microbial genetics. [SSWL = 11 hrs] Unit 7 — Bacterial physiology: Concepts, terminology, mechanisms, representative examples, and applications related to microbial ecology. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Microbiology II using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Microbial metabolism: principles, terminology, representative examples, and relation to microbial genetics.
Week 2	Microbial genetics: principles, terminology, representative examples, and relation to bacterial physiology.
Week 3	Bacterial physiology: principles, terminology, representative examples, and relation to microbial ecology.

Week 4	Microbial ecology: principles, terminology, representative examples, and relation to pathogenesis.
Week 5	Pathogenesis: principles, terminology, representative examples, and relation to diagnostic microbiology.
Week 6	Diagnostic microbiology: principles, terminology, representative examples, and relation to antimicrobial agents.
Week 7	Midterm Exam + Antimicrobial agents: key concepts, examples, and interpretation.
Week 8	Industrial applications: principles, terminology, representative examples, and relation to microbial quality control.
Week 9	Microbial quality control: principles, terminology, representative examples, and relation to applied microbiology.
Week 10	Applied microbiology: principles, terminology, representative examples, and relation to microbial metabolism.
Week 11	Microbial metabolism: principles, terminology, representative examples, and relation to microbial genetics.
Week 12	Microbial genetics: principles, terminology, representative examples, and relation to bacterial physiology.
Week 13	Bacterial physiology: principles, terminology, representative examples, and relation to microbial ecology.
Week 14	Microbial ecology: principles, terminology, representative examples, and relation to pathogenesis.
Week 15	Integration and revision: applications of pathogenesis, diagnostic microbiology, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Microbiology II.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to microbial metabolism; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to microbial genetics; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to bacterial physiology; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to microbial ecology; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to pathogenesis; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to diagnostic microbiology; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to antimicrobial agents; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to industrial applications; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to microbial quality control; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to applied microbiology; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to microbial metabolism; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to microbial genetics; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to bacterial physiology; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to microbial ecology; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Madigan et al. Brock Biology of Microorganisms.	Yes
Recommended Texts	Prescott's Microbiology.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	English Language اللغة الانكليزية II		Module Delivery
Module Type	Basic		[X] Theory [X] Lecture [ ] Lab [ ] Tutorial [ ] Practical [ ] Seminar
Module Code	UNI-24025		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	UGII	Semester of Delivery	4
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	مالك زيدان	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Assistant Lecturer	Module Leader's Qualification	M.Sc.
Module Tutor (1) Name	مهند احمد جاسم	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Module Tutor (2) Name	Name [يحتاج تعبئة من القسم العلمي]	Acad. Title / Qualification	Academic Title / Qualification
Module Tutor (3) Name	Name [يحتاج تعبئة من القسم العلمي]	Acad. Title / Qualification	Academic Title / Qualification
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of English Language and its relevance to Life Sciences. 2. To explain the key principles related to academic vocabulary, reading scientific texts, and grammar for academic writing. 3. To develop the ability to connect theoretical concepts of English Language with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to English Language. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of English Language.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of English Language (Remember). 2. Describe the main concepts of academic vocabulary and reading scientific texts (Understand). 3. Explain the biological significance of grammar for academic writing and paragraph writing (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with English Language (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to listening and speaking skills (Apply). 6. Compare selected examples, methods, or biological systems within English Language (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of English Language (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of English Language in health,

	environment, biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in English Language (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Academic vocabulary: Concepts, terminology, mechanisms, representative examples, and applications related to reading scientific texts. [SSWL = 5 hrs] Unit 2 — Grammar for academic writing: Concepts, terminology, mechanisms, representative examples, and applications related to paragraph writing. [SSWL = 5 hrs] Unit 3 — Listening and speaking skills: Concepts, terminology, mechanisms, representative examples, and applications related to scientific terminology. [SSWL = 5 hrs] Unit 4 — Summarising and paraphrasing: Concepts, terminology, mechanisms, representative examples, and applications related to presentation skills. [SSWL = 5 hrs] Unit 5 — Email and report writing: Concepts, terminology, mechanisms, representative examples, and applications related to academic vocabulary. [SSWL = 5 hrs] Unit 6 — Reading scientific texts: Concepts, terminology, mechanisms, representative examples, and applications related to grammar for academic writing. [SSWL = 4 hrs] Unit 7 — Paragraph writing: Concepts, terminology, mechanisms, representative examples, and applications related to listening and speaking skills. [SSWL = 4 hrs] Total Structured SWL = 33 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs lectures, directed reading, classroom discussion, short assignments, and applied examples. Teaching focuses on building conceptual understanding of English Language, improving academic communication, and linking the subject to the wider Life Sciences curriculum. Students are encouraged to participate actively, complete weekly tasks, and use feedback to improve written and oral performance.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Academic vocabulary: principles, terminology, representative examples, and relation to reading scientific texts.
Week 2	Reading scientific texts: principles, terminology, representative examples, and relation to grammar for academic writing.
Week 3	Grammar for academic writing: principles, terminology, representative examples, and relation to paragraph writing.
Week 4	Paragraph writing: principles, terminology, representative examples,

	and relation to listening and speaking skills.
Week 5	Listening and speaking skills: principles, terminology, representative examples, and relation to scientific terminology.
Week 6	Scientific terminology: principles, terminology, representative examples, and relation to summarising and paraphrasing.
Week 7	Midterm Exam + Summarising and paraphrasing: key concepts, examples, and interpretation.
Week 8	Presentation skills: principles, terminology, representative examples, and relation to email and report writing.
Week 9	Email and report writing: principles, terminology, representative examples, and relation to academic vocabulary.
Week 10	Academic vocabulary: principles, terminology, representative examples, and relation to reading scientific texts.
Week 11	Reading scientific texts: principles, terminology, representative examples, and relation to grammar for academic writing.
Week 12	Grammar for academic writing: principles, terminology, representative examples, and relation to paragraph writing.
Week 13	Paragraph writing: principles, terminology, representative examples, and relation to listening and speaking skills.
Week 14	Listening and speaking skills: principles, terminology, representative examples, and relation to scientific terminology.
Week 15	Integration and revision: applications of scientific terminology, summarising and paraphrasing, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 2	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 3	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 4	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 5	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 6	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 7	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 8	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 9	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 10	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 11	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 12	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 13	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 14	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 15	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 16	Not applicable: this module is delivered without a scheduled laboratory component.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Course notes prepared by the Department of Life Sciences and an approved recent textbook in the field.	Yes
Recommended Texts	Recent peer-reviewed articles, laboratory manuals, and open educational resources relevant to the module.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Arabic Language اللغة العربية II		Module Delivery
Module Type	Basic		[X] Theory [X] Lecture [ ] Lab [ ] Tutorial [ ] Practical [ ] Seminar
Module Code	UNI-24026		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	UGII	Semester of Delivery	4
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	ابتهال	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Assistant Lecturer	Module Leader's Qualification	M.Sc.
Module Tutor (1) Name	Name [يحتاج تعبئة من القسم العلمي]	Acad. Title / Qualification	Academic Title / Qualification
Module Tutor (2) Name	Name [يحتاج تعبئة من القسم العلمي]	Acad. Title / Qualification	Academic Title / Qualification
Module Tutor (3) Name	Name [يحتاج تعبئة من القسم العلمي]	Acad. Title / Qualification	Academic Title / Qualification
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Arabic Language and its relevance to Life Sciences. 2. To explain the key principles related to Arabic language skills, grammar essentials, and scientific and administrative writing. 3. To develop the ability to connect theoretical concepts of Arabic Language with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Arabic Language. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Arabic Language.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Arabic Language (Remember). 2. Describe the main concepts of Arabic language skills and grammar essentials (Understand). 3. Explain the biological significance of scientific and administrative writing and rhetoric and expression (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Arabic Language (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to reading comprehension (Apply). 6. Compare selected examples, methods, or biological systems within Arabic Language (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Arabic Language (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Arabic Language in health,

	environment, biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Arabic Language (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Arabic language skills: Concepts, terminology, mechanisms, representative examples, and applications related to grammar essentials. [SSWL = 5 hrs] Unit 2 — Scientific and administrative writing: Concepts, terminology, mechanisms, representative examples, and applications related to rhetoric and expression. [SSWL = 5 hrs] Unit 3 — Reading comprehension: Concepts, terminology, mechanisms, representative examples, and applications related to summarising and paraphrasing. [SSWL = 5 hrs] Unit 4 — Academic terminology: Concepts, terminology, mechanisms, representative examples, and applications related to common linguistic errors. [SSWL = 5 hrs] Unit 5 — Presentation and communication: Concepts, terminology, mechanisms, representative examples, and applications related to Arabic language skills. [SSWL = 5 hrs] Unit 6 — Grammar essentials: Concepts, terminology, mechanisms, representative examples, and applications related to scientific and administrative writing. [SSWL = 4 hrs] Unit 7 — Rhetoric and expression: Concepts, terminology, mechanisms, representative examples, and applications related to reading comprehension. [SSWL = 4 hrs] Total Structured SWL = 33 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs lectures, directed reading, classroom discussion, short assignments, and applied examples. Teaching focuses on building conceptual understanding of Arabic Language, improving academic communication, and linking the subject to the wider Life Sciences curriculum. Students are encouraged to participate actively, complete weekly tasks, and use feedback to improve written and oral performance.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Arabic language skills: principles, terminology, representative examples, and relation to grammar essentials.
Week 2	Grammar essentials: principles, terminology, representative examples, and relation to scientific and administrative writing.
Week 3	Scientific and administrative writing: principles, terminology, representative examples, and relation to rhetoric and expression.
Week 4	Rhetoric and expression: principles, terminology, representative

	examples, and relation to reading comprehension.
Week 5	Reading comprehension: principles, terminology, representative examples, and relation to summarising and paraphrasing.
Week 6	Summarising and paraphrasing: principles, terminology, representative examples, and relation to academic terminology.
Week 7	Midterm Exam + Academic terminology: key concepts, examples, and interpretation.
Week 8	Common linguistic errors: principles, terminology, representative examples, and relation to presentation and communication.
Week 9	Presentation and communication: principles, terminology, representative examples, and relation to Arabic language skills.
Week 10	Arabic language skills: principles, terminology, representative examples, and relation to grammar essentials.
Week 11	Grammar essentials: principles, terminology, representative examples, and relation to scientific and administrative writing.
Week 12	Scientific and administrative writing: principles, terminology, representative examples, and relation to rhetoric and expression.
Week 13	Rhetoric and expression: principles, terminology, representative examples, and relation to reading comprehension.
Week 14	Reading comprehension: principles, terminology, representative examples, and relation to summarising and paraphrasing.
Week 15	Integration and revision: applications of summarising and paraphrasing, academic terminology, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 2	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 3	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 4	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 5	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 6	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 7	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 8	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 9	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 10	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 11	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 12	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 13	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 14	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 15	Not applicable: this module is delivered without a scheduled laboratory component.
Lab 16	Not applicable: this module is delivered without a scheduled laboratory component.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Course notes prepared by the Department of Life Sciences and an approved recent textbook in the field.	Yes
Recommended Texts	Recent peer-reviewed articles, laboratory manuals, and open educational resources relevant to the module.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Computer Science علم الحاسوب II		Module Delivery
Module Type	Basic		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [ ] Seminar
Module Code	UNI-24027		
ECTS Credits	3		
SWL (hr/sem)	75		
Module Level	UGII	Semester of Delivery	4
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	ازهر محمود	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Assistant Lecturer	Module Leader's Qualification	M.Sc.
Module Tutor (1) Name	حسن محمد زيدان	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Module Tutor (2) Name	مهند احمد جاسم	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Module Tutor (3) Name	Name [يحتاج تعبئة من القسم العلمي]	Acad. Title / Qualification	Academic Title / Qualification
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Computer Science and its relevance to Life Sciences. 2. To explain the key principles related to computer hardware and software, operating systems, and word processing. 3. To develop the ability to connect theoretical concepts of Computer Science with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Computer Science. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Computer Science.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Computer Science (Remember). 2. Describe the main concepts of computer hardware and software and operating systems (Understand). 3. Explain the biological significance of word processing and spreadsheets and data handling (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Computer Science (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to presentation software (Apply). 6. Compare selected examples, methods, or biological systems within Computer Science (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Computer Science (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Computer Science in health,

	environment, biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Computer Science (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Computer hardware and software: Concepts, terminology, mechanisms, representative examples, and applications related to operating systems. [SSWL = 9 hrs] Unit 2 — Word processing: Concepts, terminology, mechanisms, representative examples, and applications related to spreadsheets and data handling. [SSWL = 9 hrs] Unit 3 — Presentation software: Concepts, terminology, mechanisms, representative examples, and applications related to internet and academic search. [SSWL = 9 hrs] Unit 4 — Database concepts: Concepts, terminology, mechanisms, representative examples, and applications related to basic programming logic. [SSWL = 9 hrs] Unit 5 — Cybersecurity awareness: Concepts, terminology, mechanisms, representative examples, and applications related to bioinformatics introduction. [SSWL = 9 hrs] Unit 6 — Computer hardware and software: Concepts, terminology, mechanisms, representative examples, and applications related to operating systems. [SSWL = 9 hrs] Unit 7 — Word processing: Concepts, terminology, mechanisms, representative examples, and applications related to spreadsheets and data handling. [SSWL = 9 hrs] Total Structured SWL = 63 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Computer Science using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	12	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Computer hardware and software: principles, terminology, representative examples, and relation to operating systems.
Week 2	Operating systems: principles, terminology, representative examples, and relation to word processing.
Week 3	Word processing: principles, terminology, representative examples, and relation to spreadsheets and data handling.

Week 4	Spreadsheets and data handling: principles, terminology, representative examples, and relation to presentation software.
Week 5	Presentation software: principles, terminology, representative examples, and relation to internet and academic search.
Week 6	Internet and academic search: principles, terminology, representative examples, and relation to database concepts.
Week 7	Midterm Exam + Database concepts: key concepts, examples, and interpretation.
Week 8	Basic programming logic: principles, terminology, representative examples, and relation to cybersecurity awareness.
Week 9	Cybersecurity awareness: principles, terminology, representative examples, and relation to bioinformatics introduction.
Week 10	Bioinformatics introduction: principles, terminology, representative examples, and relation to computer hardware and software.
Week 11	Computer hardware and software: principles, terminology, representative examples, and relation to operating systems.
Week 12	Operating systems: principles, terminology, representative examples, and relation to word processing.
Week 13	Word processing: principles, terminology, representative examples, and relation to spreadsheets and data handling.
Week 14	Spreadsheets and data handling: principles, terminology, representative examples, and relation to presentation software.
Week 15	Integration and revision: applications of presentation software, internet and academic search, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Computer Science.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to computer hardware and software; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to operating systems; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to word processing; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to spreadsheets and data handling; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to presentation software; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to internet and academic search; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to database concepts; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to basic programming logic; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to cybersecurity awareness; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to bioinformatics introduction; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to computer hardware and software; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to operating systems; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to word processing; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to spreadsheets and data handling; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Course notes prepared by the Department of Life Sciences and an approved recent textbook in the field.	Yes
Recommended Texts	Recent peer-reviewed articles, laboratory manuals, and open educational resources relevant to the module.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Cell Biology علم حياة الخلية		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-35026		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIII	Semester of Delivery	5
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	هديل عبد الهادي عمير	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	حيدر مظهر عباس	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (2) Name	رافع زيدان مخلف	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (3) Name	سراب دلف	Acad. Title / Qualification	Assistant Professor / Ph.D.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Cell Biology and its relevance to Life Sciences. 2. To explain the key principles related to cell theory and membranes, organelles, and cytoskeleton. 3. To develop the ability to connect theoretical concepts of Cell Biology with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Cell Biology. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Cell Biology.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Cell Biology (Remember). 2. Describe the main concepts of cell theory and membranes and organelles (Understand). 3. Explain the biological significance of cytoskeleton and cell transport (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Cell Biology (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to cell signalling (Apply). 6. Compare selected examples, methods, or biological systems within Cell Biology (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Cell Biology (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Cell Biology in health, environment,

	biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Cell Biology (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Cell theory and membranes: Concepts, terminology, mechanisms, representative examples, and applications related to organelles. [SSWL = 12 hrs] Unit 2 — Cytoskeleton: Concepts, terminology, mechanisms, representative examples, and applications related to cell transport. [SSWL = 12 hrs] Unit 3 — Cell signalling: Concepts, terminology, mechanisms, representative examples, and applications related to cell cycle. [SSWL = 11 hrs] Unit 4 — Mitosis and meiosis: Concepts, terminology, mechanisms, representative examples, and applications related to apoptosis. [SSWL = 11 hrs] Unit 5 — Cell communication: Concepts, terminology, mechanisms, representative examples, and applications related to cell biology techniques. [SSWL = 11 hrs] Unit 6 — Cell theory and membranes: Concepts, terminology, mechanisms, representative examples, and applications related to organelles. [SSWL = 11 hrs] Unit 7 — Cytoskeleton: Concepts, terminology, mechanisms, representative examples, and applications related to cell transport. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Cell Biology using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Cell theory and membranes: principles, terminology, representative examples, and relation to organelles.
Week 2	Organelles: principles, terminology, representative examples, and relation to cytoskeleton.
Week 3	Cytoskeleton: principles, terminology, representative examples, and relation to cell transport.

Week 4	Cell transport: principles, terminology, representative examples, and relation to cell signalling.
Week 5	Cell signalling: principles, terminology, representative examples, and relation to cell cycle.
Week 6	Cell cycle: principles, terminology, representative examples, and relation to mitosis and meiosis.
Week 7	Midterm Exam + Mitosis and meiosis: key concepts, examples, and interpretation.
Week 8	Apoptosis: principles, terminology, representative examples, and relation to cell communication.
Week 9	Cell communication: principles, terminology, representative examples, and relation to cell biology techniques.
Week 10	Cell biology techniques: principles, terminology, representative examples, and relation to cell theory and membranes.
Week 11	Cell theory and membranes: principles, terminology, representative examples, and relation to organelles.
Week 12	Organelles: principles, terminology, representative examples, and relation to cytoskeleton.
Week 13	Cytoskeleton: principles, terminology, representative examples, and relation to cell transport.
Week 14	Cell transport: principles, terminology, representative examples, and relation to cell signalling.
Week 15	Integration and revision: applications of cell signalling, cell cycle, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Cell Biology.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to cell theory and membranes; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to organelles; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to cytoskeleton; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to cell transport; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to cell signalling; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to cell cycle; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to mitosis and meiosis; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to apoptosis; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to cell communication; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to cell biology techniques; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to cell theory and membranes; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to organelles; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to cytoskeleton; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to cell transport; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Alberts et al. Molecular Biology of the Cell.	Yes
Recommended Texts	Lodish et al. Molecular Cell Biology.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com	Online resources

	https://www.khanacademy.org/science	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Ecology علم البيئة		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-35027		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIII	Semester of Delivery	5
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	ابراهيم عمر سعيد	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	بشار طارق إسماعيل	Acad. Title / Qualification	Assistant Professor / Qualification
Module Tutor (2) Name	شيماء فاتح علي	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (3) Name	احمد عيدان	Acad. Title / Qualification	Lecturer / Ph.D.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Ecology and its relevance to Life Sciences. 2. To explain the key principles related to ecosystem structure, energy flow, and biogeochemical cycles. 3. To develop the ability to connect theoretical concepts of Ecology with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Ecology. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Ecology.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Ecology (Remember). 2. Describe the main concepts of ecosystem structure and energy flow (Understand). 3. Explain the biological significance of biogeochemical cycles and population ecology (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Ecology (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to community ecology (Apply). 6. Compare selected examples, methods, or biological systems within Ecology (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Ecology (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Ecology in health, environment,

	biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Ecology (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Ecosystem structure: Concepts, terminology, mechanisms, representative examples, and applications related to energy flow. [SSWL = 12 hrs] Unit 2 — Biogeochemical cycles: Concepts, terminology, mechanisms, representative examples, and applications related to population ecology. [SSWL = 12 hrs] Unit 3 — Community ecology: Concepts, terminology, mechanisms, representative examples, and applications related to biodiversity. [SSWL = 11 hrs] Unit 4 — Ecological succession: Concepts, terminology, mechanisms, representative examples, and applications related to ecosystem services. [SSWL = 11 hrs] Unit 5 — Environmental monitoring: Concepts, terminology, mechanisms, representative examples, and applications related to conservation biology. [SSWL = 11 hrs] Unit 6 — Ecosystem structure: Concepts, terminology, mechanisms, representative examples, and applications related to energy flow. [SSWL = 11 hrs] Unit 7 — Biogeochemical cycles: Concepts, terminology, mechanisms, representative examples, and applications related to population ecology. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Ecology using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Ecosystem structure: principles, terminology, representative examples, and relation to energy flow.
Week 2	Energy flow: principles, terminology, representative examples, and relation to biogeochemical cycles.
Week 3	Biogeochemical cycles: principles, terminology, representative examples, and relation to population ecology.

Week 4	Population ecology: principles, terminology, representative examples, and relation to community ecology.
Week 5	Community ecology: principles, terminology, representative examples, and relation to biodiversity.
Week 6	Biodiversity: principles, terminology, representative examples, and relation to ecological succession.
Week 7	Midterm Exam + Ecological succession: key concepts, examples, and interpretation.
Week 8	Ecosystem services: principles, terminology, representative examples, and relation to environmental monitoring.
Week 9	Environmental monitoring: principles, terminology, representative examples, and relation to conservation biology.
Week 10	Conservation biology: principles, terminology, representative examples, and relation to ecosystem structure.
Week 11	Ecosystem structure: principles, terminology, representative examples, and relation to energy flow.
Week 12	Energy flow: principles, terminology, representative examples, and relation to biogeochemical cycles.
Week 13	Biogeochemical cycles: principles, terminology, representative examples, and relation to population ecology.
Week 14	Population ecology: principles, terminology, representative examples, and relation to community ecology.
Week 15	Integration and revision: applications of community ecology, biodiversity, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Ecology.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to ecosystem structure; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to energy flow; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to biogeochemical cycles; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to population ecology; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to community ecology; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to biodiversity; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to ecological succession; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to ecosystem services; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to environmental monitoring; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to conservation biology; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to ecosystem structure; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to energy flow; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to biogeochemical cycles; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to population ecology; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Begon, Townsend & Harper. Ecology: From Individuals to Ecosystems.	Yes
Recommended Texts	Odum & Barrett. Fundamentals of Ecology.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Histology علم الانسجة		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-35028		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIII	Semester of Delivery	5
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	منى صلاح رشيد	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	حسين محمد عبد الله طياوي	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (2) Name	ورود محمد مطر	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (3) Name	اتين عامر حميد	Acad. Title / Qualification	Lecturer / Ph.D.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Histology and its relevance to Life Sciences. 2. To explain the key principles related to histological methods, epithelial tissue, and connective tissue. 3. To develop the ability to connect theoretical concepts of Histology with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Histology. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Histology.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Histology (Remember). 2. Describe the main concepts of histological methods and epithelial tissue (Understand). 3. Explain the biological significance of connective tissue and cartilage and bone (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Histology (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to blood and hematopoiesis (Apply). 6. Compare selected examples, methods, or biological systems within Histology (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Histology (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Histology in health, environment,

	biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Histology (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Histological methods: Concepts, terminology, mechanisms, representative examples, and applications related to epithelial tissue. [SSWL = 12 hrs] Unit 2 — Connective tissue: Concepts, terminology, mechanisms, representative examples, and applications related to cartilage and bone. [SSWL = 12 hrs] Unit 3 — Blood and hematopoiesis: Concepts, terminology, mechanisms, representative examples, and applications related to muscle tissue. [SSWL = 11 hrs] Unit 4 — Nervous tissue: Concepts, terminology, mechanisms, representative examples, and applications related to cardiovascular histology. [SSWL = 11 hrs] Unit 5 — Digestive histology: Concepts, terminology, mechanisms, representative examples, and applications related to urinary and reproductive histology. [SSWL = 11 hrs] Unit 6 — Histological methods: Concepts, terminology, mechanisms, representative examples, and applications related to epithelial tissue. [SSWL = 11 hrs] Unit 7 — Connective tissue: Concepts, terminology, mechanisms, representative examples, and applications related to cartilage and bone. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Histology using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Histological methods: principles, terminology, representative examples, and relation to epithelial tissue.
Week 2	Epithelial tissue: principles, terminology, representative examples, and relation to connective tissue.
Week 3	Connective tissue: principles, terminology, representative examples, and relation to cartilage and bone.

Week 4	Cartilage and bone: principles, terminology, representative examples, and relation to blood and hematopoiesis.
Week 5	Blood and hematopoiesis: principles, terminology, representative examples, and relation to muscle tissue.
Week 6	Muscle tissue: principles, terminology, representative examples, and relation to nervous tissue.
Week 7	Midterm Exam + Nervous tissue: key concepts, examples, and interpretation.
Week 8	Cardiovascular histology: principles, terminology, representative examples, and relation to digestive histology.
Week 9	Digestive histology: principles, terminology, representative examples, and relation to urinary and reproductive histology.
Week 10	Urinary and reproductive histology: principles, terminology, representative examples, and relation to histological methods.
Week 11	Histological methods: principles, terminology, representative examples, and relation to epithelial tissue.
Week 12	Epithelial tissue: principles, terminology, representative examples, and relation to connective tissue.
Week 13	Connective tissue: principles, terminology, representative examples, and relation to cartilage and bone.
Week 14	Cartilage and bone: principles, terminology, representative examples, and relation to blood and hematopoiesis.
Week 15	Integration and revision: applications of blood and hematopoiesis, muscle tissue, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Histology.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to histological methods; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to epithelial tissue; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to connective tissue; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to cartilage and bone; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to blood and hematopoiesis; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to muscle tissue; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to nervous tissue; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to cardiovascular histology; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to digestive histology; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to urinary and reproductive histology; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to histological methods; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to epithelial tissue; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to connective tissue; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to cartilage and bone; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Ross, M.H. & Pawlina, W. (2020). Histology: A Text and Atlas (8th ed.). Wolters Kluwer.	Yes
Recommended Texts	Junqueira's Basic Histology; Wheater's Functional Histology.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Mycology علم الفطريات		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-35029		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIII	Semester of Delivery	5
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	سارا قحطان سليمان	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	هوازن احمد عبد خلف	Acad. Title / Qualification	Professor / Ph.D.
Module Tutor (2) Name	همام سعدي حسين علي	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (3) Name	رند سلوان نعمان	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Mycology and its relevance to Life Sciences. 2. To explain the key principles related to fungal morphology, fungal nutrition, and reproduction. 3. To develop the ability to connect theoretical concepts of Mycology with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Mycology. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Mycology.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Mycology (Remember). 2. Describe the main concepts of fungal morphology and fungal nutrition (Understand). 3. Explain the biological significance of reproduction and classification of fungi (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Mycology (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to yeasts and moulds (Apply). 6. Compare selected examples, methods, or biological systems within Mycology (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Mycology (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Mycology in health, environment,

	biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Mycology (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Fungal morphology: Concepts, terminology, mechanisms, representative examples, and applications related to fungal nutrition. [SSWL = 12 hrs] Unit 2 — Reproduction: Concepts, terminology, mechanisms, representative examples, and applications related to classification of fungi. [SSWL = 12 hrs] Unit 3 — Yeasts and moulds: Concepts, terminology, mechanisms, representative examples, and applications related to medical mycology. [SSWL = 11 hrs] Unit 4 — Plant pathogenic fungi: Concepts, terminology, mechanisms, representative examples, and applications related to industrial fungi. [SSWL = 11 hrs] Unit 5 — Mycotoxins: Concepts, terminology, mechanisms, representative examples, and applications related to fungal identification. [SSWL = 11 hrs] Unit 6 — Fungal morphology: Concepts, terminology, mechanisms, representative examples, and applications related to fungal nutrition. [SSWL = 11 hrs] Unit 7 — Reproduction: Concepts, terminology, mechanisms, representative examples, and applications related to classification of fungi. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Mycology using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Fungal morphology: principles, terminology, representative examples, and relation to fungal nutrition.
Week 2	Fungal nutrition: principles, terminology, representative examples, and relation to reproduction.
Week 3	Reproduction: principles, terminology, representative examples, and relation to classification of fungi.

Week 4	Classification of fungi: principles, terminology, representative examples, and relation to yeasts and moulds.
Week 5	Yeasts and moulds: principles, terminology, representative examples, and relation to medical mycology.
Week 6	Medical mycology: principles, terminology, representative examples, and relation to plant pathogenic fungi.
Week 7	Midterm Exam + Plant pathogenic fungi: key concepts, examples, and interpretation.
Week 8	Industrial fungi: principles, terminology, representative examples, and relation to mycotoxins.
Week 9	Mycotoxins: principles, terminology, representative examples, and relation to fungal identification.
Week 10	Fungal identification: principles, terminology, representative examples, and relation to fungal morphology.
Week 11	Fungal morphology: principles, terminology, representative examples, and relation to fungal nutrition.
Week 12	Fungal nutrition: principles, terminology, representative examples, and relation to reproduction.
Week 13	Reproduction: principles, terminology, representative examples, and relation to classification of fungi.
Week 14	Classification of fungi: principles, terminology, representative examples, and relation to yeasts and moulds.
Week 15	Integration and revision: applications of yeasts and moulds, medical mycology, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Mycology.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to fungal morphology; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to fungal nutrition; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to reproduction; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to classification of fungi; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to yeasts and moulds; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to medical mycology; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to plant pathogenic fungi; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to industrial fungi; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to mycotoxins; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to fungal identification; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to fungal morphology; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to fungal nutrition; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to reproduction; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to classification of fungi; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Course notes prepared by the Department of Life Sciences and an approved recent textbook in the field.	Yes
Recommended Texts	Recent peer-reviewed articles, laboratory manuals, and open educational resources relevant to the module.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Plant Physiology علم فسلجة النبات		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-35030		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIII	Semester of Delivery	5
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	ايمن عدوان عبد	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	رواد خلف حميد	Acad. Title / Qualification	Lecturer / M.Sc.
Module Tutor (2) Name	عمر وسام	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Module Tutor (3) Name	نور عدنان عبد الله حسين	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Plant Physiology and its relevance to Life Sciences. 2. To explain the key principles related to water relations, mineral nutrition, and photosynthesis. 3. To develop the ability to connect theoretical concepts of Plant Physiology with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Plant Physiology. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Plant Physiology.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Plant Physiology (Remember). 2. Describe the main concepts of water relations and mineral nutrition (Understand). 3. Explain the biological significance of photosynthesis and respiration (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Plant Physiology (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to transpiration (Apply). 6. Compare selected examples, methods, or biological systems within Plant Physiology (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Plant Physiology (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Plant Physiology in health,

	environment, biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Plant Physiology (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Water relations: Concepts, terminology, mechanisms, representative examples, and applications related to mineral nutrition. [SSWL = 12 hrs] Unit 2 — Photosynthesis: Concepts, terminology, mechanisms, representative examples, and applications related to respiration. [SSWL = 12 hrs] Unit 3 — Transpiration: Concepts, terminology, mechanisms, representative examples, and applications related to plant hormones. [SSWL = 11 hrs] Unit 4 — Growth and development: Concepts, terminology, mechanisms, representative examples, and applications related to seed germination. [SSWL = 11 hrs] Unit 5 — Stress physiology: Concepts, terminology, mechanisms, representative examples, and applications related to plant responses. [SSWL = 11 hrs] Unit 6 — Water relations: Concepts, terminology, mechanisms, representative examples, and applications related to mineral nutrition. [SSWL = 11 hrs] Unit 7 — Photosynthesis: Concepts, terminology, mechanisms, representative examples, and applications related to respiration. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Plant Physiology using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Water relations: principles, terminology, representative examples, and relation to mineral nutrition.
Week 2	Mineral nutrition: principles, terminology, representative examples, and relation to photosynthesis.
Week 3	Photosynthesis: principles, terminology, representative examples, and relation to respiration.

Week 4	Respiration: principles, terminology, representative examples, and relation to transpiration.
Week 5	Transpiration: principles, terminology, representative examples, and relation to plant hormones.
Week 6	Plant hormones: principles, terminology, representative examples, and relation to growth and development.
Week 7	Midterm Exam + Growth and development: key concepts, examples, and interpretation.
Week 8	Seed germination: principles, terminology, representative examples, and relation to stress physiology.
Week 9	Stress physiology: principles, terminology, representative examples, and relation to plant responses.
Week 10	Plant responses: principles, terminology, representative examples, and relation to water relations.
Week 11	Water relations: principles, terminology, representative examples, and relation to mineral nutrition.
Week 12	Mineral nutrition: principles, terminology, representative examples, and relation to photosynthesis.
Week 13	Photosynthesis: principles, terminology, representative examples, and relation to respiration.
Week 14	Respiration: principles, terminology, representative examples, and relation to transpiration.
Week 15	Integration and revision: applications of transpiration, plant hormones, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Plant Physiology.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to water relations; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to mineral nutrition; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to photosynthesis; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to respiration; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to transpiration; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to plant hormones; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to growth and development; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to seed germination; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to stress physiology; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to plant responses; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to water relations; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to mineral nutrition; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to photosynthesis; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to respiration; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Taiz et al. Plant Physiology and Development.	Yes
Recommended Texts	Hopkins & Huner. Introduction to Plant Physiology.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Bio Techniques تقنيات احيائية		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-35031		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIII	Semester of Delivery	5
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	صفا صلاح سلمان	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Qualification
Module Tutor (1) Name	نور معاذ احمد	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (2) Name	مهند جسام	Acad. Title / Qualification	Lecturer / Ph.D.
Module Tutor (3) Name	جرجيس خلف سالم	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Bio Techniques and its relevance to Life Sciences. 2. To explain the key principles related to laboratory safety and measurement, microscopy, and centrifugation. 3. To develop the ability to connect theoretical concepts of Bio Techniques with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Bio Techniques. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Bio Techniques.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Bio Techniques (Remember). 2. Describe the main concepts of laboratory safety and measurement and microscopy (Understand). 3. Explain the biological significance of centrifugation and spectrophotometry (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Bio Techniques (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to chromatography (Apply). 6. Compare selected examples, methods, or biological systems within Bio Techniques (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Bio Techniques (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Bio Techniques in health, environment,

	biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Bio Techniques (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Laboratory safety and measurement: Concepts, terminology, mechanisms, representative examples, and applications related to microscopy. [SSWL = 12 hrs] Unit 2 — Centrifugation: Concepts, terminology, mechanisms, representative examples, and applications related to spectrophotometry. [SSWL = 12 hrs] Unit 3 — Chromatography: Concepts, terminology, mechanisms, representative examples, and applications related to electrophoresis. [SSWL = 11 hrs] Unit 4 — Pcr basics: Concepts, terminology, mechanisms, representative examples, and applications related to sterile techniques. [SSWL = 11 hrs] Unit 5 — Data recording: Concepts, terminology, mechanisms, representative examples, and applications related to scientific reporting. [SSWL = 11 hrs] Unit 6 — Laboratory safety and measurement: Concepts, terminology, mechanisms, representative examples, and applications related to microscopy. [SSWL = 11 hrs] Unit 7 — Centrifugation: Concepts, terminology, mechanisms, representative examples, and applications related to spectrophotometry. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Bio Techniques using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Laboratory safety and measurement: principles, terminology, representative examples, and relation to microscopy.
Week 2	Microscopy: principles, terminology, representative examples, and relation to centrifugation.
Week 3	Centrifugation: principles, terminology, representative examples, and relation to spectrophotometry.

Week 4	Spectrophotometry: principles, terminology, representative examples, and relation to chromatography.
Week 5	Chromatography: principles, terminology, representative examples, and relation to electrophoresis.
Week 6	Electrophoresis: principles, terminology, representative examples, and relation to PCR basics.
Week 7	Midterm Exam + Pcr basics: key concepts, examples, and interpretation.
Week 8	Sterile techniques: principles, terminology, representative examples, and relation to data recording.
Week 9	Data recording: principles, terminology, representative examples, and relation to scientific reporting.
Week 10	Scientific reporting: principles, terminology, representative examples, and relation to laboratory safety and measurement.
Week 11	Laboratory safety and measurement: principles, terminology, representative examples, and relation to microscopy.
Week 12	Microscopy: principles, terminology, representative examples, and relation to centrifugation.
Week 13	Centrifugation: principles, terminology, representative examples, and relation to spectrophotometry.
Week 14	Spectrophotometry: principles, terminology, representative examples, and relation to chromatography.
Week 15	Integration and revision: applications of chromatography, electrophoresis, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Bio Techniques.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to laboratory safety and measurement; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to microscopy; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to centrifugation; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to spectrophotometry; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to chromatography; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to electrophoresis; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to PCR basics; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to sterile techniques; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to data recording; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to scientific reporting; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to laboratory safety and measurement; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to microscopy; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to centrifugation; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to spectrophotometry; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Course notes prepared by the Department of Life Sciences and an approved recent textbook in the field.	Yes
Recommended Texts	Recent peer-reviewed articles, laboratory manuals, and open educational resources relevant to the module.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Genetics علم الوراثة		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-36138		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIII	Semester of Delivery	6
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	هديل عبد الهادي عمير	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	حيدر مظهر عباس	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (2) Name	رافع زيدان مخلف	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (3) Name	سراب دلف خلف	Acad. Title / Qualification	Assistant Professor / Ph.D.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Bio-35026	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. To provide students with a systematic understanding of Genetics and its relevance to Life Sciences. 2. To explain the key principles related to Mendelian inheritance, extensions of Mendelism, and linkage and crossing over. 3. To develop the ability to connect theoretical concepts of Genetics with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Genetics. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Genetics.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Genetics (Remember). 2. Describe the main concepts of Mendelian inheritance and extensions of Mendelism (Understand). 3. Explain the biological significance of linkage and crossing over and chromosomal inheritance (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Genetics (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to gene structure (Apply). 6. Compare selected examples, methods, or biological systems within Genetics (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Genetics (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Genetics in health, environment,

	biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Genetics (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Mendelian inheritance: Concepts, terminology, mechanisms, representative examples, and applications related to extensions of Mendelism. [SSWL = 12 hrs] Unit 2 — Linkage and crossing over: Concepts, terminology, mechanisms, representative examples, and applications related to chromosomal inheritance. [SSWL = 12 hrs] Unit 3 — Gene structure: Concepts, terminology, mechanisms, representative examples, and applications related to mutation. [SSWL = 11 hrs] Unit 4 — Population genetics: Concepts, terminology, mechanisms, representative examples, and applications related to quantitative genetics. [SSWL = 11 hrs] Unit 5 — Cytoplasmic inheritance: Concepts, terminology, mechanisms, representative examples, and applications related to genetic analysis. [SSWL = 11 hrs] Unit 6 — Mendelian inheritance: Concepts, terminology, mechanisms, representative examples, and applications related to extensions of Mendelism. [SSWL = 11 hrs] Unit 7 — Linkage and crossing over: Concepts, terminology, mechanisms, representative examples, and applications related to chromosomal inheritance. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Genetics using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Mendelian inheritance: principles, terminology, representative examples, and relation to extensions of Mendelism.
Week 2	Extensions of mendelism: principles, terminology, representative examples, and relation to linkage and crossing over.
Week 3	Linkage and crossing over: principles, terminology, representative examples, and relation to chromosomal inheritance.

Week 4	Chromosomal inheritance: principles, terminology, representative examples, and relation to gene structure.
Week 5	Gene structure: principles, terminology, representative examples, and relation to mutation.
Week 6	Mutation: principles, terminology, representative examples, and relation to population genetics.
Week 7	Midterm Exam + Population genetics: key concepts, examples, and interpretation.
Week 8	Quantitative genetics: principles, terminology, representative examples, and relation to cytoplasmic inheritance.
Week 9	Cytoplasmic inheritance: principles, terminology, representative examples, and relation to genetic analysis.
Week 10	Genetic analysis: principles, terminology, representative examples, and relation to Mendelian inheritance.
Week 11	Mendelian inheritance: principles, terminology, representative examples, and relation to extensions of Mendelism.
Week 12	Extensions of mendelism: principles, terminology, representative examples, and relation to linkage and crossing over.
Week 13	Linkage and crossing over: principles, terminology, representative examples, and relation to chromosomal inheritance.
Week 14	Chromosomal inheritance: principles, terminology, representative examples, and relation to gene structure.
Week 15	Integration and revision: applications of gene structure, mutation, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Genetics.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to Mendelian inheritance; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to extensions of Mendelism; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to linkage and crossing over; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to chromosomal inheritance; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to gene structure; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to mutation; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to population genetics; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to quantitative genetics; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to cytoplasmic inheritance; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to genetic analysis; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to Mendelian inheritance; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to extensions of Mendelism; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to linkage and crossing over; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to chromosomal inheritance; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Pierce, B.A. Genetics: A Conceptual Approach.	Yes
Recommended Texts	Griffiths et al. Introduction to Genetic Analysis.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Pollution التلوث البيئي		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-36139		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIII	Semester of Delivery	6
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	ابراهيم عمر سعيد	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	بشار طارق إسماعيل	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (2) Name	شيماء فاتح علي	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (3) Name	احمد عيدان	Acad. Title / Qualification	Lecturer / Ph.D.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Bio-35027	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. To provide students with a systematic understanding of Pollution and its relevance to Life Sciences. 2. To explain the key principles related to environmental pollution concepts, air pollution, and water pollution. 3. To develop the ability to connect theoretical concepts of Pollution with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Pollution. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Pollution.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Pollution (Remember). 2. Describe the main concepts of environmental pollution concepts and air pollution (Understand). 3. Explain the biological significance of water pollution and soil pollution (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Pollution (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to bioindicators (Apply). 6. Compare selected examples, methods, or biological systems within Pollution (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Pollution (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Pollution in health, environment,

	biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Pollution (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Environmental pollution concepts: Concepts, terminology, mechanisms, representative examples, and applications related to air pollution. [SSWL = 12 hrs] Unit 2 — Water pollution: Concepts, terminology, mechanisms, representative examples, and applications related to soil pollution. [SSWL = 12 hrs] Unit 3 — Bioindicators: Concepts, terminology, mechanisms, representative examples, and applications related to toxicology basics. [SSWL = 11 hrs] Unit 4 — Monitoring methods: Concepts, terminology, mechanisms, representative examples, and applications related to bioremediation. [SSWL = 11 hrs] Unit 5 — Waste management: Concepts, terminology, mechanisms, representative examples, and applications related to environmental impact assessment. [SSWL = 11 hrs] Unit 6 — Environmental pollution concepts: Concepts, terminology, mechanisms, representative examples, and applications related to air pollution. [SSWL = 11 hrs] Unit 7 — Water pollution: Concepts, terminology, mechanisms, representative examples, and applications related to soil pollution. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Pollution using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Environmental pollution concepts: principles, terminology, representative examples, and relation to air pollution.
Week 2	Air pollution: principles, terminology, representative examples, and relation to water pollution.
Week 3	Water pollution: principles, terminology, representative examples, and relation to soil pollution.

Week 4	Soil pollution: principles, terminology, representative examples, and relation to bioindicators.
Week 5	Bioindicators: principles, terminology, representative examples, and relation to toxicology basics.
Week 6	Toxicology basics: principles, terminology, representative examples, and relation to monitoring methods.
Week 7	Midterm Exam + Monitoring methods: key concepts, examples, and interpretation.
Week 8	Bioremediation: principles, terminology, representative examples, and relation to waste management.
Week 9	Waste management: principles, terminology, representative examples, and relation to environmental impact assessment.
Week 10	Environmental impact assessment: principles, terminology, representative examples, and relation to environmental pollution concepts.
Week 11	Environmental pollution concepts: principles, terminology, representative examples, and relation to air pollution.
Week 12	Air pollution: principles, terminology, representative examples, and relation to water pollution.
Week 13	Water pollution: principles, terminology, representative examples, and relation to soil pollution.
Week 14	Soil pollution: principles, terminology, representative examples, and relation to bioindicators.
Week 15	Integration and revision: applications of bioindicators, toxicology basics, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Pollution.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to environmental pollution concepts; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to air pollution; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to water pollution; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to soil pollution; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to bioindicators; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to toxicology basics; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to monitoring methods; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to bioremediation; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to waste management; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to environmental impact assessment; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to environmental pollution concepts; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to air pollution; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to water pollution; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to soil pollution; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?

Required Texts	Course notes prepared by the Department of Life Sciences and an approved recent textbook in the field.	Yes
Recommended Texts	Recent peer-reviewed articles, laboratory manuals, and open educational resources relevant to the module.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Animal Physiology فسلجة حيوان		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-36140		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIII	Semester of Delivery	6
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	ساريا ناجي محسن صالح	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	حسين محمد عبد الله طياوي	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (2) Name	ريم اديب محمد	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (3) Name	محمود ذنون ابراهيم	Acad. Title / Qualification	Assistant Professor / Ph.D.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Animal Physiology and its relevance to Life Sciences. 2. To explain the key principles related to homeostasis, nerve physiology, and muscle physiology. 3. To develop the ability to connect theoretical concepts of Animal Physiology with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Animal Physiology. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Animal Physiology.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Animal Physiology (Remember). 2. Describe the main concepts of homeostasis and nerve physiology (Understand). 3. Explain the biological significance of muscle physiology and blood and circulation (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Animal Physiology (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to respiration (Apply). 6. Compare selected examples, methods, or biological systems within Animal Physiology (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Animal Physiology (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Animal Physiology in health,

	environment, biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Animal Physiology (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Homeostasis: Concepts, terminology, mechanisms, representative examples, and applications related to nerve physiology. [SSWL = 12 hrs] Unit 2 — Muscle physiology: Concepts, terminology, mechanisms, representative examples, and applications related to blood and circulation. [SSWL = 12 hrs] Unit 3 — Respiration: Concepts, terminology, mechanisms, representative examples, and applications related to digestion. [SSWL = 11 hrs] Unit 4 — Renal physiology: Concepts, terminology, mechanisms, representative examples, and applications related to endocrine regulation. [SSWL = 11 hrs] Unit 5 — Reproduction: Concepts, terminology, mechanisms, representative examples, and applications related to thermal regulation. [SSWL = 11 hrs] Unit 6 — Homeostasis: Concepts, terminology, mechanisms, representative examples, and applications related to nerve physiology. [SSWL = 11 hrs] Unit 7 — Muscle physiology: Concepts, terminology, mechanisms, representative examples, and applications related to blood and circulation. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Animal Physiology using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Homeostasis: principles, terminology, representative examples, and relation to nerve physiology.
Week 2	Nerve physiology: principles, terminology, representative examples, and relation to muscle physiology.
Week 3	Muscle physiology: principles, terminology, representative examples, and relation to blood and circulation.

Week 4	Blood and circulation: principles, terminology, representative examples, and relation to respiration.
Week 5	Respiration: principles, terminology, representative examples, and relation to digestion.
Week 6	Digestion: principles, terminology, representative examples, and relation to renal physiology.
Week 7	Midterm Exam + Renal physiology: key concepts, examples, and interpretation.
Week 8	Endocrine regulation: principles, terminology, representative examples, and relation to reproduction.
Week 9	Reproduction: principles, terminology, representative examples, and relation to thermal regulation.
Week 10	Thermal regulation: principles, terminology, representative examples, and relation to homeostasis.
Week 11	Homeostasis: principles, terminology, representative examples, and relation to nerve physiology.
Week 12	Nerve physiology: principles, terminology, representative examples, and relation to muscle physiology.
Week 13	Muscle physiology: principles, terminology, representative examples, and relation to blood and circulation.
Week 14	Blood and circulation: principles, terminology, representative examples, and relation to respiration.
Week 15	Integration and revision: applications of respiration, digestion, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Animal Physiology.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to homeostasis; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to nerve physiology; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to muscle physiology; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to blood and circulation; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to respiration; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to digestion; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to renal physiology; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to endocrine regulation; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to reproduction; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to thermal regulation; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to homeostasis; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to nerve physiology; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to muscle physiology; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to blood and circulation; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Hickman et al. Integrated Principles of	Yes

	Zoology.	
Recommended Texts	Relevant zoology, parasitology, and entomology atlases approved by the department.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Plant diseases امراض نباتية		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-36141		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIII	Semester of Delivery	6
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	هوازن احمد عبد خلف	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	رواد خلف حميد	Acad. Title / Qualification	Lecturer / M.Sc.
Module Tutor (2) Name	رند سلوان نعمان	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Module Tutor (3) Name	ريام حسن	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Bio-35029	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. To provide students with a systematic understanding of Plant diseases and its relevance to Life Sciences. 2. To explain the key principles related to plant pathology concepts, disease symptoms, and fungal diseases. 3. To develop the ability to connect theoretical concepts of Plant diseases with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Plant diseases. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Plant diseases.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Plant diseases (Remember). 2. Describe the main concepts of plant pathology concepts and disease symptoms (Understand). 3. Explain the biological significance of fungal diseases and bacterial diseases (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Plant diseases (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to viral diseases (Apply). 6. Compare selected examples, methods, or biological systems within Plant diseases (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Plant diseases (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Plant diseases in health, environment,

	biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Plant diseases (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Plant pathology concepts: Concepts, terminology, mechanisms, representative examples, and applications related to disease symptoms. [SSWL = 12 hrs] Unit 2 — Fungal diseases: Concepts, terminology, mechanisms, representative examples, and applications related to bacterial diseases. [SSWL = 12 hrs] Unit 3 — Viral diseases: Concepts, terminology, mechanisms, representative examples, and applications related to nematode diseases. [SSWL = 11 hrs] Unit 4 — Disease cycles: Concepts, terminology, mechanisms, representative examples, and applications related to epidemiology. [SSWL = 11 hrs] Unit 5 — Diagnosis: Concepts, terminology, mechanisms, representative examples, and applications related to management strategies. [SSWL = 11 hrs] Unit 6 — Plant pathology concepts: Concepts, terminology, mechanisms, representative examples, and applications related to disease symptoms. [SSWL = 11 hrs] Unit 7 — Fungal diseases: Concepts, terminology, mechanisms, representative examples, and applications related to bacterial diseases. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Plant diseases using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Plant pathology concepts: principles, terminology, representative examples, and relation to disease symptoms.
Week 2	Disease symptoms: principles, terminology, representative examples, and relation to fungal diseases.
Week 3	Fungal diseases: principles, terminology, representative examples, and relation to bacterial diseases.

Week 4	Bacterial diseases: principles, terminology, representative examples, and relation to viral diseases.
Week 5	Viral diseases: principles, terminology, representative examples, and relation to nematode diseases.
Week 6	Nematode diseases: principles, terminology, representative examples, and relation to disease cycles.
Week 7	Midterm Exam + Disease cycles: key concepts, examples, and interpretation.
Week 8	Epidemiology: principles, terminology, representative examples, and relation to diagnosis.
Week 9	Diagnosis: principles, terminology, representative examples, and relation to management strategies.
Week 10	Management strategies: principles, terminology, representative examples, and relation to plant pathology concepts.
Week 11	Plant pathology concepts: principles, terminology, representative examples, and relation to disease symptoms.
Week 12	Disease symptoms: principles, terminology, representative examples, and relation to fungal diseases.
Week 13	Fungal diseases: principles, terminology, representative examples, and relation to bacterial diseases.
Week 14	Bacterial diseases: principles, terminology, representative examples, and relation to viral diseases.
Week 15	Integration and revision: applications of viral diseases, nematode diseases, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Plant diseases.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to plant pathology concepts; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to disease symptoms; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to fungal diseases; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to bacterial diseases; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to viral diseases; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to nematode diseases; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to disease cycles; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to epidemiology; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to diagnosis; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to management strategies; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to plant pathology concepts; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to disease symptoms; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to fungal diseases; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to bacterial diseases; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Taiz et al. Plant Physiology and Development / Raven Biology of Plants.	Yes
Recommended Texts	Selected flora, taxonomy, and plant science atlases approved by the department.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Embryology علم الاجنة		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-36142		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIII	Semester of Delivery	6
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	منى صلاح رشيد	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	ورود محمد مطر	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (2) Name	اتين عامر حميد	Acad. Title / Qualification	Lecturer / Ph.D.
Module Tutor (3) Name	انهار ربيع حسين	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Bio-35028	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. To provide students with a systematic understanding of Embryology and its relevance to Life Sciences. 2. To explain the key principles related to gametogenesis, fertilisation, and cleavage. 3. To develop the ability to connect theoretical concepts of Embryology with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Embryology. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Embryology.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Embryology (Remember). 2. Describe the main concepts of gametogenesis and fertilisation (Understand). 3. Explain the biological significance of cleavage and blastulation (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Embryology (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to gastrulation (Apply). 6. Compare selected examples, methods, or biological systems within Embryology (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Embryology (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Embryology in health, environment,

	biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Embryology (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Gametogenesis: Concepts, terminology, mechanisms, representative examples, and applications related to fertilisation. [SSWL = 12 hrs] Unit 2 — Cleavage: Concepts, terminology, mechanisms, representative examples, and applications related to blastulation. [SSWL = 12 hrs] Unit 3 — Gastrulation: Concepts, terminology, mechanisms, representative examples, and applications related to neurulation. [SSWL = 11 hrs] Unit 4 — Organogenesis: Concepts, terminology, mechanisms, representative examples, and applications related to placentation. [SSWL = 11 hrs] Unit 5 — Developmental regulation: Concepts, terminology, mechanisms, representative examples, and applications related to congenital abnormalities. [SSWL = 11 hrs] Unit 6 — Gametogenesis: Concepts, terminology, mechanisms, representative examples, and applications related to fertilisation. [SSWL = 11 hrs] Unit 7 — Cleavage: Concepts, terminology, mechanisms, representative examples, and applications related to blastulation. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Embryology using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Gametogenesis: principles, terminology, representative examples, and relation to fertilisation.
Week 2	Fertilisation: principles, terminology, representative examples, and relation to cleavage.
Week 3	Cleavage: principles, terminology, representative examples, and relation to blastulation.

Week 4	Blastulation: principles, terminology, representative examples, and relation to gastrulation.
Week 5	Gastrulation: principles, terminology, representative examples, and relation to neurulation.
Week 6	Neurulation: principles, terminology, representative examples, and relation to organogenesis.
Week 7	Midterm Exam + Organogenesis: key concepts, examples, and interpretation.
Week 8	Placentation: principles, terminology, representative examples, and relation to developmental regulation.
Week 9	Developmental regulation: principles, terminology, representative examples, and relation to congenital abnormalities.
Week 10	Congenital abnormalities: principles, terminology, representative examples, and relation to gametogenesis.
Week 11	Gametogenesis: principles, terminology, representative examples, and relation to fertilisation.
Week 12	Fertilisation: principles, terminology, representative examples, and relation to cleavage.
Week 13	Cleavage: principles, terminology, representative examples, and relation to blastulation.
Week 14	Blastulation: principles, terminology, representative examples, and relation to gastrulation.
Week 15	Integration and revision: applications of gastrulation, neurulation, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Embryology.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to gametogenesis; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to fertilisation; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to cleavage; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to blastulation; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to gastrulation; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to neurulation; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to organogenesis; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to placentation; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to developmental regulation; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to congenital abnormalities; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to gametogenesis; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to fertilisation; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to cleavage; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to blastulation; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Course notes prepared by the Department of Life Sciences and an approved recent textbook in the field.	Yes
Recommended Texts	Recent peer-reviewed articles, laboratory manuals, and open educational resources	No

	relevant to the module.	
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Hematology علم الدم		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-36142		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIII	Semester of Delivery	6
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	موسى جاسم محمد الحميش	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	موفق مطلك زيدان	Acad. Title / Qualification	Professor / Ph.D.
Module Tutor (2) Name	ريم اديب محمد	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (3) Name	تيسير خليل ابراهيم	Acad. Title / Qualification	Lecturer / Ph.D.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Hematology and its relevance to Life Sciences. 2. To explain the key principles related to blood composition, hematopoiesis, and erythrocytes. 3. To develop the ability to connect theoretical concepts of Hematology with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Hematology. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Hematology.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Hematology (Remember). 2. Describe the main concepts of blood composition and hematopoiesis (Understand). 3. Explain the biological significance of erythrocytes and leukocytes (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Hematology (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to platelets (Apply). 6. Compare selected examples, methods, or biological systems within Hematology (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Hematology (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Hematology in health, environment,

	biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Hematology (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Blood composition: Concepts, terminology, mechanisms, representative examples, and applications related to hematopoiesis. [SSWL = 12 hrs] Unit 2 — Erythrocytes: Concepts, terminology, mechanisms, representative examples, and applications related to leukocytes. [SSWL = 12 hrs] Unit 3 — Platelets: Concepts, terminology, mechanisms, representative examples, and applications related to anemia. [SSWL = 11 hrs] Unit 4 — Leukocyte disorders: Concepts, terminology, mechanisms, representative examples, and applications related to hemostasis. [SSWL = 11 hrs] Unit 5 — Blood grouping: Concepts, terminology, mechanisms, representative examples, and applications related to hematology tests. [SSWL = 11 hrs] Unit 6 — Blood composition: Concepts, terminology, mechanisms, representative examples, and applications related to hematopoiesis. [SSWL = 11 hrs] Unit 7 — Erythrocytes: Concepts, terminology, mechanisms, representative examples, and applications related to leukocytes. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Hematology using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Blood composition: principles, terminology, representative examples, and relation to hematopoiesis.
Week 2	Hematopoiesis: principles, terminology, representative examples, and relation to erythrocytes.
Week 3	Erythrocytes: principles, terminology, representative examples, and relation to leukocytes.

Week 4	Leukocytes: principles, terminology, representative examples, and relation to platelets.
Week 5	Platelets: principles, terminology, representative examples, and relation to anemia.
Week 6	Anemia: principles, terminology, representative examples, and relation to leukocyte disorders.
Week 7	Midterm Exam + Leukocyte disorders: key concepts, examples, and interpretation.
Week 8	Hemostasis: principles, terminology, representative examples, and relation to blood grouping.
Week 9	Blood grouping: principles, terminology, representative examples, and relation to hematology tests.
Week 10	Hematology tests: principles, terminology, representative examples, and relation to blood composition.
Week 11	Blood composition: principles, terminology, representative examples, and relation to hematopoiesis.
Week 12	Hematopoiesis: principles, terminology, representative examples, and relation to erythrocytes.
Week 13	Erythrocytes: principles, terminology, representative examples, and relation to leukocytes.
Week 14	Leukocytes: principles, terminology, representative examples, and relation to platelets.
Week 15	Integration and revision: applications of platelets, anemia, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Hematology.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to blood composition; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to hematopoiesis; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to erythrocytes; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to leukocytes; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to platelets; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to anemia; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to leukocyte disorders; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to hemostasis; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to blood grouping; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to hematology tests; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to blood composition; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to hematopoiesis; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to erythrocytes; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to leukocytes; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Course notes prepared by the Department of Life Sciences and an approved recent textbook in the field.	Yes

Recommended Texts	Recent peer-reviewed articles, laboratory manuals, and open educational resources relevant to the module.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Cell Biology علم حياة الخلية		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-35032		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIII	Semester of Delivery	5
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	هديل عبد الهادي عمير	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	حيدر مظهر عباس	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (2) Name	رافع زيدان مخلف	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (3) Name	سراب دلف	Acad. Title / Qualification	Assistant Professor / Ph.D.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Cell Biology and its relevance to Life Sciences. 2. To explain the key principles related to cell theory and membranes, organelles, and cytoskeleton. 3. To develop the ability to connect theoretical concepts of Cell Biology with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Cell Biology. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Cell Biology.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Cell Biology (Remember). 2. Describe the main concepts of cell theory and membranes and organelles (Understand). 3. Explain the biological significance of cytoskeleton and cell transport (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Cell Biology (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to cell signalling (Apply). 6. Compare selected examples, methods, or biological systems within Cell Biology (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Cell Biology (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Cell Biology in health, environment,

	biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Cell Biology (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Cell theory and membranes: Concepts, terminology, mechanisms, representative examples, and applications related to organelles. [SSWL = 12 hrs] Unit 2 — Cytoskeleton: Concepts, terminology, mechanisms, representative examples, and applications related to cell transport. [SSWL = 12 hrs] Unit 3 — Cell signalling: Concepts, terminology, mechanisms, representative examples, and applications related to cell cycle. [SSWL = 11 hrs] Unit 4 — Mitosis and meiosis: Concepts, terminology, mechanisms, representative examples, and applications related to apoptosis. [SSWL = 11 hrs] Unit 5 — Cell communication: Concepts, terminology, mechanisms, representative examples, and applications related to cell biology techniques. [SSWL = 11 hrs] Unit 6 — Cell theory and membranes: Concepts, terminology, mechanisms, representative examples, and applications related to organelles. [SSWL = 11 hrs] Unit 7 — Cytoskeleton: Concepts, terminology, mechanisms, representative examples, and applications related to cell transport. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Cell Biology using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Cell theory and membranes: principles, terminology, representative examples, and relation to organelles.
Week 2	Organelles: principles, terminology, representative examples, and relation to cytoskeleton.
Week 3	Cytoskeleton: principles, terminology, representative examples, and relation to cell transport.

Week 4	Cell transport: principles, terminology, representative examples, and relation to cell signalling.
Week 5	Cell signalling: principles, terminology, representative examples, and relation to cell cycle.
Week 6	Cell cycle: principles, terminology, representative examples, and relation to mitosis and meiosis.
Week 7	Midterm Exam + Mitosis and meiosis: key concepts, examples, and interpretation.
Week 8	Apoptosis: principles, terminology, representative examples, and relation to cell communication.
Week 9	Cell communication: principles, terminology, representative examples, and relation to cell biology techniques.
Week 10	Cell biology techniques: principles, terminology, representative examples, and relation to cell theory and membranes.
Week 11	Cell theory and membranes: principles, terminology, representative examples, and relation to organelles.
Week 12	Organelles: principles, terminology, representative examples, and relation to cytoskeleton.
Week 13	Cytoskeleton: principles, terminology, representative examples, and relation to cell transport.
Week 14	Cell transport: principles, terminology, representative examples, and relation to cell signalling.
Week 15	Integration and revision: applications of cell signalling, cell cycle, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Cell Biology.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to cell theory and membranes; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to organelles; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to cytoskeleton; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to cell transport; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to cell signalling; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to cell cycle; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to mitosis and meiosis; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to apoptosis; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to cell communication; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to cell biology techniques; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to cell theory and membranes; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to organelles; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to cytoskeleton; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to cell transport; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Alberts et al. Molecular Biology of the Cell.	Yes
Recommended Texts	Lodish et al. Molecular Cell Biology.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com	Online resources

	https://www.khanacademy.org/science	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Ecology علم البيئة		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-35033		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIII	Semester of Delivery	5
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	ابراهيم عمر سعيد	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	بشار طارق إسماعيل	Acad. Title / Qualification	Assistant Professor / Qualification
Module Tutor (2) Name	شيماء فاتح علي	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (3) Name	احمد عيدان	Acad. Title / Qualification	Lecturer / Ph.D.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Ecology and its relevance to Life Sciences. 2. To explain the key principles related to ecosystem structure, energy flow, and biogeochemical cycles. 3. To develop the ability to connect theoretical concepts of Ecology with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Ecology. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Ecology.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Ecology (Remember). 2. Describe the main concepts of ecosystem structure and energy flow (Understand). 3. Explain the biological significance of biogeochemical cycles and population ecology (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Ecology (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to community ecology (Apply). 6. Compare selected examples, methods, or biological systems within Ecology (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Ecology (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Ecology in health, environment,

	biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Ecology (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Ecosystem structure: Concepts, terminology, mechanisms, representative examples, and applications related to energy flow. [SSWL = 12 hrs] Unit 2 — Biogeochemical cycles: Concepts, terminology, mechanisms, representative examples, and applications related to population ecology. [SSWL = 12 hrs] Unit 3 — Community ecology: Concepts, terminology, mechanisms, representative examples, and applications related to biodiversity. [SSWL = 11 hrs] Unit 4 — Ecological succession: Concepts, terminology, mechanisms, representative examples, and applications related to ecosystem services. [SSWL = 11 hrs] Unit 5 — Environmental monitoring: Concepts, terminology, mechanisms, representative examples, and applications related to conservation biology. [SSWL = 11 hrs] Unit 6 — Ecosystem structure: Concepts, terminology, mechanisms, representative examples, and applications related to energy flow. [SSWL = 11 hrs] Unit 7 — Biogeochemical cycles: Concepts, terminology, mechanisms, representative examples, and applications related to population ecology. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Ecology using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Ecosystem structure: principles, terminology, representative examples, and relation to energy flow.
Week 2	Energy flow: principles, terminology, representative examples, and relation to biogeochemical cycles.
Week 3	Biogeochemical cycles: principles, terminology, representative examples, and relation to population ecology.

Week 4	Population ecology: principles, terminology, representative examples, and relation to community ecology.
Week 5	Community ecology: principles, terminology, representative examples, and relation to biodiversity.
Week 6	Biodiversity: principles, terminology, representative examples, and relation to ecological succession.
Week 7	Midterm Exam + Ecological succession: key concepts, examples, and interpretation.
Week 8	Ecosystem services: principles, terminology, representative examples, and relation to environmental monitoring.
Week 9	Environmental monitoring: principles, terminology, representative examples, and relation to conservation biology.
Week 10	Conservation biology: principles, terminology, representative examples, and relation to ecosystem structure.
Week 11	Ecosystem structure: principles, terminology, representative examples, and relation to energy flow.
Week 12	Energy flow: principles, terminology, representative examples, and relation to biogeochemical cycles.
Week 13	Biogeochemical cycles: principles, terminology, representative examples, and relation to population ecology.
Week 14	Population ecology: principles, terminology, representative examples, and relation to community ecology.
Week 15	Integration and revision: applications of community ecology, biodiversity, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Ecology.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to ecosystem structure; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to energy flow; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to biogeochemical cycles; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to population ecology; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to community ecology; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to biodiversity; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to ecological succession; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to ecosystem services; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to environmental monitoring; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to conservation biology; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to ecosystem structure; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to energy flow; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to biogeochemical cycles; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to population ecology; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Begon, Townsend & Harper. Ecology: From Individuals to Ecosystems.	Yes
Recommended Texts	Odum & Barrett. Fundamentals of Ecology.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Histology علم الانسجة		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-35034		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIII	Semester of Delivery	5
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	منى صلاح رشيد	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	حسين محمد عبد الله طياوي	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (2) Name	ورود محمد مطر	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (3) Name	اتين عامر حميد	Acad. Title / Qualification	Lecturer / Ph.D.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Histology and its relevance to Life Sciences. 2. To explain the key principles related to histological methods, epithelial tissue, and connective tissue. 3. To develop the ability to connect theoretical concepts of Histology with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Histology. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Histology.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Histology (Remember). 2. Describe the main concepts of histological methods and epithelial tissue (Understand). 3. Explain the biological significance of connective tissue and cartilage and bone (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Histology (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to blood and hematopoiesis (Apply). 6. Compare selected examples, methods, or biological systems within Histology (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Histology (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Histology in health, environment,

	biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Histology (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Histological methods: Concepts, terminology, mechanisms, representative examples, and applications related to epithelial tissue. [SSWL = 12 hrs] Unit 2 — Connective tissue: Concepts, terminology, mechanisms, representative examples, and applications related to cartilage and bone. [SSWL = 12 hrs] Unit 3 — Blood and hematopoiesis: Concepts, terminology, mechanisms, representative examples, and applications related to muscle tissue. [SSWL = 11 hrs] Unit 4 — Nervous tissue: Concepts, terminology, mechanisms, representative examples, and applications related to cardiovascular histology. [SSWL = 11 hrs] Unit 5 — Digestive histology: Concepts, terminology, mechanisms, representative examples, and applications related to urinary and reproductive histology. [SSWL = 11 hrs] Unit 6 — Histological methods: Concepts, terminology, mechanisms, representative examples, and applications related to epithelial tissue. [SSWL = 11 hrs] Unit 7 — Connective tissue: Concepts, terminology, mechanisms, representative examples, and applications related to cartilage and bone. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Histology using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Histological methods: principles, terminology, representative examples, and relation to epithelial tissue.
Week 2	Epithelial tissue: principles, terminology, representative examples, and relation to connective tissue.
Week 3	Connective tissue: principles, terminology, representative examples, and relation to cartilage and bone.

Week 4	Cartilage and bone: principles, terminology, representative examples, and relation to blood and hematopoiesis.
Week 5	Blood and hematopoiesis: principles, terminology, representative examples, and relation to muscle tissue.
Week 6	Muscle tissue: principles, terminology, representative examples, and relation to nervous tissue.
Week 7	Midterm Exam + Nervous tissue: key concepts, examples, and interpretation.
Week 8	Cardiovascular histology: principles, terminology, representative examples, and relation to digestive histology.
Week 9	Digestive histology: principles, terminology, representative examples, and relation to urinary and reproductive histology.
Week 10	Urinary and reproductive histology: principles, terminology, representative examples, and relation to histological methods.
Week 11	Histological methods: principles, terminology, representative examples, and relation to epithelial tissue.
Week 12	Epithelial tissue: principles, terminology, representative examples, and relation to connective tissue.
Week 13	Connective tissue: principles, terminology, representative examples, and relation to cartilage and bone.
Week 14	Cartilage and bone: principles, terminology, representative examples, and relation to blood and hematopoiesis.
Week 15	Integration and revision: applications of blood and hematopoiesis, muscle tissue, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Histology.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to histological methods; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to epithelial tissue; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to connective tissue; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to cartilage and bone; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to blood and hematopoiesis; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to muscle tissue; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to nervous tissue; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to cardiovascular histology; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to digestive histology; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to urinary and reproductive histology; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to histological methods; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to epithelial tissue; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to connective tissue; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to cartilage and bone; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Ross, M.H. & Pawlina, W. (2020). Histology: A Text and Atlas (8th ed.). Wolters Kluwer.	Yes
Recommended Texts	Junqueira's Basic Histology; Wheater's Functional Histology.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Mycology علم الفطريات		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-35035		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIII	Semester of Delivery	5
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	سارا قحطان سليمان	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	هوازن احمد عبد خلف	Acad. Title / Qualification	Professor / Ph.D.
Module Tutor (2) Name	همام سعدي حسين علي	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (3) Name	رند سلوان نعمان	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Mycology and its relevance to Life Sciences. 2. To explain the key principles related to fungal morphology, fungal nutrition, and reproduction. 3. To develop the ability to connect theoretical concepts of Mycology with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Mycology. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Mycology.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Mycology (Remember). 2. Describe the main concepts of fungal morphology and fungal nutrition (Understand). 3. Explain the biological significance of reproduction and classification of fungi (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Mycology (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to yeasts and moulds (Apply). 6. Compare selected examples, methods, or biological systems within Mycology (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Mycology (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Mycology in health, environment,

	biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Mycology (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Fungal morphology: Concepts, terminology, mechanisms, representative examples, and applications related to fungal nutrition. [SSWL = 12 hrs] Unit 2 — Reproduction: Concepts, terminology, mechanisms, representative examples, and applications related to classification of fungi. [SSWL = 12 hrs] Unit 3 — Yeasts and moulds: Concepts, terminology, mechanisms, representative examples, and applications related to medical mycology. [SSWL = 11 hrs] Unit 4 — Plant pathogenic fungi: Concepts, terminology, mechanisms, representative examples, and applications related to industrial fungi. [SSWL = 11 hrs] Unit 5 — Mycotoxins: Concepts, terminology, mechanisms, representative examples, and applications related to fungal identification. [SSWL = 11 hrs] Unit 6 — Fungal morphology: Concepts, terminology, mechanisms, representative examples, and applications related to fungal nutrition. [SSWL = 11 hrs] Unit 7 — Reproduction: Concepts, terminology, mechanisms, representative examples, and applications related to classification of fungi. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Mycology using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Fungal morphology: principles, terminology, representative examples, and relation to fungal nutrition.
Week 2	Fungal nutrition: principles, terminology, representative examples, and relation to reproduction.
Week 3	Reproduction: principles, terminology, representative examples, and relation to classification of fungi.

Week 4	Classification of fungi: principles, terminology, representative examples, and relation to yeasts and moulds.
Week 5	Yeasts and moulds: principles, terminology, representative examples, and relation to medical mycology.
Week 6	Medical mycology: principles, terminology, representative examples, and relation to plant pathogenic fungi.
Week 7	Midterm Exam + Plant pathogenic fungi: key concepts, examples, and interpretation.
Week 8	Industrial fungi: principles, terminology, representative examples, and relation to mycotoxins.
Week 9	Mycotoxins: principles, terminology, representative examples, and relation to fungal identification.
Week 10	Fungal identification: principles, terminology, representative examples, and relation to fungal morphology.
Week 11	Fungal morphology: principles, terminology, representative examples, and relation to fungal nutrition.
Week 12	Fungal nutrition: principles, terminology, representative examples, and relation to reproduction.
Week 13	Reproduction: principles, terminology, representative examples, and relation to classification of fungi.
Week 14	Classification of fungi: principles, terminology, representative examples, and relation to yeasts and moulds.
Week 15	Integration and revision: applications of yeasts and moulds, medical mycology, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Mycology.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to fungal morphology; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to fungal nutrition; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to reproduction; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to classification of fungi; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to yeasts and moulds; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to medical mycology; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to plant pathogenic fungi; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to industrial fungi; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to mycotoxins; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to fungal identification; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to fungal morphology; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to fungal nutrition; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to reproduction; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to classification of fungi; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Course notes prepared by the Department of Life Sciences and an approved recent textbook in the field.	Yes
Recommended Texts	Recent peer-reviewed articles, laboratory manuals, and open educational resources relevant to the module.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Microbiology physiology فسلجة احياء مجهرية		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-35036		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIII	Semester of Delivery	5
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	ريام فارس صالح	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	سندس جاسم محمد	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (2) Name	أرشد مهدي حمد	Acad. Title / Qualification	Lecturer / Ph.D.
Module Tutor (3) Name	اسيل فاضل محمود	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Microbiology physiology and its relevance to Life Sciences. 2. To explain the key principles related to bacterial growth, nutrition, and enzyme regulation. 3. To develop the ability to connect theoretical concepts of Microbiology physiology with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Microbiology physiology. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Microbiology physiology.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Microbiology physiology (Remember). 2. Describe the main concepts of bacterial growth and nutrition (Understand). 3. Explain the biological significance of enzyme regulation and energy metabolism (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Microbiology physiology (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to respiration and fermentation (Apply). 6. Compare selected examples, methods, or biological systems within Microbiology physiology (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Microbiology physiology (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Microbiology physiology in health,

	environment, biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Microbiology physiology (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Bacterial growth: Concepts, terminology, mechanisms, representative examples, and applications related to nutrition. [SSWL = 12 hrs] Unit 2 — Enzyme regulation: Concepts, terminology, mechanisms, representative examples, and applications related to energy metabolism. [SSWL = 12 hrs] Unit 3 — Respiration and fermentation: Concepts, terminology, mechanisms, representative examples, and applications related to stress responses. [SSWL = 11 hrs] Unit 4 — Biofilms: Concepts, terminology, mechanisms, representative examples, and applications related to sporulation. [SSWL = 11 hrs] Unit 5 — Microbial communication: Concepts, terminology, mechanisms, representative examples, and applications related to physiological adaptations. [SSWL = 11 hrs] Unit 6 — Bacterial growth: Concepts, terminology, mechanisms, representative examples, and applications related to nutrition. [SSWL = 11 hrs] Unit 7 — Enzyme regulation: Concepts, terminology, mechanisms, representative examples, and applications related to energy metabolism. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Microbiology physiology using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Bacterial growth: principles, terminology, representative examples, and relation to nutrition.
Week 2	Nutrition: principles, terminology, representative examples, and relation to enzyme regulation.
Week 3	Enzyme regulation: principles, terminology, representative examples, and relation to energy metabolism.

Week 4	Energy metabolism: principles, terminology, representative examples, and relation to respiration and fermentation.
Week 5	Respiration and fermentation: principles, terminology, representative examples, and relation to stress responses.
Week 6	Stress responses: principles, terminology, representative examples, and relation to biofilms.
Week 7	Midterm Exam + Biofilms: key concepts, examples, and interpretation.
Week 8	Sporulation: principles, terminology, representative examples, and relation to microbial communication.
Week 9	Microbial communication: principles, terminology, representative examples, and relation to physiological adaptations.
Week 10	Physiological adaptations: principles, terminology, representative examples, and relation to bacterial growth.
Week 11	Bacterial growth: principles, terminology, representative examples, and relation to nutrition.
Week 12	Nutrition: principles, terminology, representative examples, and relation to enzyme regulation.
Week 13	Enzyme regulation: principles, terminology, representative examples, and relation to energy metabolism.
Week 14	Energy metabolism: principles, terminology, representative examples, and relation to respiration and fermentation.
Week 15	Integration and revision: applications of respiration and fermentation, stress responses, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Microbiology physiology.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to bacterial growth; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to nutrition; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to enzyme regulation; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to energy metabolism; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to respiration and fermentation; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to stress responses; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to biofilms; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to sporulation; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to microbial communication; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to physiological adaptations; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to bacterial growth; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to nutrition; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to enzyme regulation; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to energy metabolism; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Madigan et al. Brock Biology of	Yes

	Microorganisms.	
Recommended Texts	Prescott's Microbiology and selected clinical/applied microbiology references.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Soil and Water Microbiology احياء مجهرية تربة ومياه		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-35037		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIII	Semester of Delivery	5
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	سعادت مصطفى محمد	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	شادمان طارق صادق	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (2) Name	رغد زياد سليمان	Acad. Title / Qualification	Lecturer / Ph.D.
Module Tutor (3) Name	Name [يحتاج تعبئة من القسم العلمي]	Acad. Title / Qualification	Academic Title / Qualification
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Soil and Water Microbiology and its relevance to Life Sciences. 2. To explain the key principles related to soil microbial communities, rhizosphere microbiology, and biogeochemical cycles. 3. To develop the ability to connect theoretical concepts of Soil and Water Microbiology with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Soil and Water Microbiology. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Soil and Water Microbiology.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Soil and Water Microbiology (Remember). 2. Describe the main concepts of soil microbial communities and rhizosphere microbiology (Understand). 3. Explain the biological significance of biogeochemical cycles and nitrogen fixation (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Soil and Water Microbiology (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to water microbiology (Apply). 6. Compare selected examples, methods, or biological systems within Soil and Water Microbiology (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Soil and Water Microbiology (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Soil and Water Microbiology in health,

	environment, biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Soil and Water Microbiology (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Soil microbial communities: Concepts, terminology, mechanisms, representative examples, and applications related to rhizosphere microbiology. [SSWL = 12 hrs] Unit 2 — Biogeochemical cycles: Concepts, terminology, mechanisms, representative examples, and applications related to nitrogen fixation. [SSWL = 12 hrs] Unit 3 — Water microbiology: Concepts, terminology, mechanisms, representative examples, and applications related to indicator organisms. [SSWL = 11 hrs] Unit 4 — Wastewater microbes: Concepts, terminology, mechanisms, representative examples, and applications related to microbial testing. [SSWL = 11 hrs] Unit 5 — Pathogens in water: Concepts, terminology, mechanisms, representative examples, and applications related to environmental applications. [SSWL = 11 hrs] Unit 6 — Soil microbial communities: Concepts, terminology, mechanisms, representative examples, and applications related to rhizosphere microbiology. [SSWL = 11 hrs] Unit 7 — Biogeochemical cycles: Concepts, terminology, mechanisms, representative examples, and applications related to nitrogen fixation. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Soil and Water Microbiology using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Soil microbial communities: principles, terminology, representative examples, and relation to rhizosphere microbiology.
Week 2	Rhizosphere microbiology: principles, terminology, representative examples, and relation to biogeochemical cycles.
Week 3	Biogeochemical cycles: principles, terminology, representative examples, and relation to nitrogen fixation.

Week 4	Nitrogen fixation: principles, terminology, representative examples, and relation to water microbiology.
Week 5	Water microbiology: principles, terminology, representative examples, and relation to indicator organisms.
Week 6	Indicator organisms: principles, terminology, representative examples, and relation to wastewater microbes.
Week 7	Midterm Exam + Wastewater microbes: key concepts, examples, and interpretation.
Week 8	Microbial testing: principles, terminology, representative examples, and relation to pathogens in water.
Week 9	Pathogens in water: principles, terminology, representative examples, and relation to environmental applications.
Week 10	Environmental applications: principles, terminology, representative examples, and relation to soil microbial communities.
Week 11	Soil microbial communities: principles, terminology, representative examples, and relation to rhizosphere microbiology.
Week 12	Rhizosphere microbiology: principles, terminology, representative examples, and relation to biogeochemical cycles.
Week 13	Biogeochemical cycles: principles, terminology, representative examples, and relation to nitrogen fixation.
Week 14	Nitrogen fixation: principles, terminology, representative examples, and relation to water microbiology.
Week 15	Integration and revision: applications of water microbiology, indicator organisms, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Soil and Water Microbiology.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to soil microbial communities; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to rhizosphere microbiology; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to biogeochemical cycles; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to nitrogen fixation; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to water microbiology; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to indicator organisms; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to wastewater microbes; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to microbial testing; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to pathogens in water; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to environmental applications; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to soil microbial communities; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to rhizosphere microbiology; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to biogeochemical cycles; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to nitrogen fixation; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Madigan et al. Brock Biology of Microorganisms.	Yes
Recommended Texts	Prescott's Microbiology and selected clinical/applied microbiology references.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Genetics علم الوراثة		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-36144		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIII	Semester of Delivery	6
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	هديل عبد الهادي عمير	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	حيدر مظهر عباس	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (2) Name	رافع زيدان مخلف	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (3) Name	سراب دلف خلف	Acad. Title / Qualification	Assistant Professor / Ph.D.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Bio-35032	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. To provide students with a systematic understanding of Genetics and its relevance to Life Sciences. 2. To explain the key principles related to Mendelian inheritance, extensions of Mendelism, and linkage and crossing over. 3. To develop the ability to connect theoretical concepts of Genetics with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Genetics. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Genetics.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Genetics (Remember). 2. Describe the main concepts of Mendelian inheritance and extensions of Mendelism (Understand). 3. Explain the biological significance of linkage and crossing over and chromosomal inheritance (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Genetics (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to gene structure (Apply). 6. Compare selected examples, methods, or biological systems within Genetics (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Genetics (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Genetics in health, environment,

	biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Genetics (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Mendelian inheritance: Concepts, terminology, mechanisms, representative examples, and applications related to extensions of Mendelism. [SSWL = 12 hrs] Unit 2 — Linkage and crossing over: Concepts, terminology, mechanisms, representative examples, and applications related to chromosomal inheritance. [SSWL = 12 hrs] Unit 3 — Gene structure: Concepts, terminology, mechanisms, representative examples, and applications related to mutation. [SSWL = 11 hrs] Unit 4 — Population genetics: Concepts, terminology, mechanisms, representative examples, and applications related to quantitative genetics. [SSWL = 11 hrs] Unit 5 — Cytoplasmic inheritance: Concepts, terminology, mechanisms, representative examples, and applications related to genetic analysis. [SSWL = 11 hrs] Unit 6 — Mendelian inheritance: Concepts, terminology, mechanisms, representative examples, and applications related to extensions of Mendelism. [SSWL = 11 hrs] Unit 7 — Linkage and crossing over: Concepts, terminology, mechanisms, representative examples, and applications related to chromosomal inheritance. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Genetics using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Mendelian inheritance: principles, terminology, representative examples, and relation to extensions of Mendelism.
Week 2	Extensions of mendelism: principles, terminology, representative examples, and relation to linkage and crossing over.
Week 3	Linkage and crossing over: principles, terminology, representative examples, and relation to chromosomal inheritance.

Week 4	Chromosomal inheritance: principles, terminology, representative examples, and relation to gene structure.
Week 5	Gene structure: principles, terminology, representative examples, and relation to mutation.
Week 6	Mutation: principles, terminology, representative examples, and relation to population genetics.
Week 7	Midterm Exam + Population genetics: key concepts, examples, and interpretation.
Week 8	Quantitative genetics: principles, terminology, representative examples, and relation to cytoplasmic inheritance.
Week 9	Cytoplasmic inheritance: principles, terminology, representative examples, and relation to genetic analysis.
Week 10	Genetic analysis: principles, terminology, representative examples, and relation to Mendelian inheritance.
Week 11	Mendelian inheritance: principles, terminology, representative examples, and relation to extensions of Mendelism.
Week 12	Extensions of mendelism: principles, terminology, representative examples, and relation to linkage and crossing over.
Week 13	Linkage and crossing over: principles, terminology, representative examples, and relation to chromosomal inheritance.
Week 14	Chromosomal inheritance: principles, terminology, representative examples, and relation to gene structure.
Week 15	Integration and revision: applications of gene structure, mutation, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Genetics.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to Mendelian inheritance; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to extensions of Mendelism; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to linkage and crossing over; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to chromosomal inheritance; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to gene structure; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to mutation; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to population genetics; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to quantitative genetics; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to cytoplasmic inheritance; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to genetic analysis; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to Mendelian inheritance; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to extensions of Mendelism; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to linkage and crossing over; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to chromosomal inheritance; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Pierce, B.A. Genetics: A Conceptual Approach.	Yes
Recommended Texts	Griffiths et al. Introduction to Genetic Analysis.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Pollution التلوث البيئي		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-36145		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIII	Semester of Delivery	6
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	ابراهيم عمر سعيد	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	بشار طارق إسماعيل	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (2) Name	شيماء فاتح علي	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (3) Name	احمد عيدان	Acad. Title / Qualification	Lecturer / Ph.D.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Bio-35033	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. To provide students with a systematic understanding of Pollution and its relevance to Life Sciences. 2. To explain the key principles related to environmental pollution concepts, air pollution, and water pollution. 3. To develop the ability to connect theoretical concepts of Pollution with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Pollution. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Pollution.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Pollution (Remember). 2. Describe the main concepts of environmental pollution concepts and air pollution (Understand). 3. Explain the biological significance of water pollution and soil pollution (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Pollution (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to bioindicators (Apply). 6. Compare selected examples, methods, or biological systems within Pollution (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Pollution (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Pollution in health, environment,

	biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Pollution (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Environmental pollution concepts: Concepts, terminology, mechanisms, representative examples, and applications related to air pollution. [SSWL = 12 hrs] Unit 2 — Water pollution: Concepts, terminology, mechanisms, representative examples, and applications related to soil pollution. [SSWL = 12 hrs] Unit 3 — Bioindicators: Concepts, terminology, mechanisms, representative examples, and applications related to toxicology basics. [SSWL = 11 hrs] Unit 4 — Monitoring methods: Concepts, terminology, mechanisms, representative examples, and applications related to bioremediation. [SSWL = 11 hrs] Unit 5 — Waste management: Concepts, terminology, mechanisms, representative examples, and applications related to environmental impact assessment. [SSWL = 11 hrs] Unit 6 — Environmental pollution concepts: Concepts, terminology, mechanisms, representative examples, and applications related to air pollution. [SSWL = 11 hrs] Unit 7 — Water pollution: Concepts, terminology, mechanisms, representative examples, and applications related to soil pollution. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Pollution using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Environmental pollution concepts: principles, terminology, representative examples, and relation to air pollution.
Week 2	Air pollution: principles, terminology, representative examples, and relation to water pollution.
Week 3	Water pollution: principles, terminology, representative examples, and relation to soil pollution.

Week 4	Soil pollution: principles, terminology, representative examples, and relation to bioindicators.
Week 5	Bioindicators: principles, terminology, representative examples, and relation to toxicology basics.
Week 6	Toxicology basics: principles, terminology, representative examples, and relation to monitoring methods.
Week 7	Midterm Exam + Monitoring methods: key concepts, examples, and interpretation.
Week 8	Bioremediation: principles, terminology, representative examples, and relation to waste management.
Week 9	Waste management: principles, terminology, representative examples, and relation to environmental impact assessment.
Week 10	Environmental impact assessment: principles, terminology, representative examples, and relation to environmental pollution concepts.
Week 11	Environmental pollution concepts: principles, terminology, representative examples, and relation to air pollution.
Week 12	Air pollution: principles, terminology, representative examples, and relation to water pollution.
Week 13	Water pollution: principles, terminology, representative examples, and relation to soil pollution.
Week 14	Soil pollution: principles, terminology, representative examples, and relation to bioindicators.
Week 15	Integration and revision: applications of bioindicators, toxicology basics, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Pollution.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to environmental pollution concepts; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to air pollution; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to water pollution; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to soil pollution; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to bioindicators; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to toxicology basics; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to monitoring methods; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to bioremediation; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to waste management; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to environmental impact assessment; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to environmental pollution concepts; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to air pollution; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to water pollution; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to soil pollution; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?

Required Texts	Course notes prepared by the Department of Life Sciences and an approved recent textbook in the field.	Yes
Recommended Texts	Recent peer-reviewed articles, laboratory manuals, and open educational resources relevant to the module.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Biological treatment معالجة بايولوجية		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-36146		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIII	Semester of Delivery	6
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	سعادت مصطفى محمد	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	محمد غضبان فرحان	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (2) Name	مروة مزاحم مهدي	Acad. Title / Qualification	Lecturer / Ph.D.
Module Tutor (3) Name	علي عصام ممدوح علوان	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Biological treatment and its relevance to Life Sciences. 2. To explain the key principles related to bioremediation principles, wastewater treatment, and activated sludge. 3. To develop the ability to connect theoretical concepts of Biological treatment with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Biological treatment. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Biological treatment.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Biological treatment (Remember). 2. Describe the main concepts of bioremediation principles and wastewater treatment (Understand). 3. Explain the biological significance of activated sludge and biofilms (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Biological treatment (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to anaerobic digestion (Apply). 6. Compare selected examples, methods, or biological systems within Biological treatment (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Biological treatment (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Biological treatment in health,

	environment, biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Biological treatment (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Bioremediation principles: Concepts, terminology, mechanisms, representative examples, and applications related to wastewater treatment. [SSWL = 12 hrs] Unit 2 — Activated sludge: Concepts, terminology, mechanisms, representative examples, and applications related to biofilms. [SSWL = 12 hrs] Unit 3 — Anaerobic digestion: Concepts, terminology, mechanisms, representative examples, and applications related to composting. [SSWL = 11 hrs] Unit 4 — Microbial degradation: Concepts, terminology, mechanisms, representative examples, and applications related to treatment monitoring. [SSWL = 11 hrs] Unit 5 — Bioreactor operation: Concepts, terminology, mechanisms, representative examples, and applications related to case studies. [SSWL = 11 hrs] Unit 6 — Bioremediation principles: Concepts, terminology, mechanisms, representative examples, and applications related to wastewater treatment. [SSWL = 11 hrs] Unit 7 — Activated sludge: Concepts, terminology, mechanisms, representative examples, and applications related to biofilms. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Biological treatment using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Bioremediation principles: principles, terminology, representative examples, and relation to wastewater treatment.
Week 2	Wastewater treatment: principles, terminology, representative examples, and relation to activated sludge.
Week 3	Activated sludge: principles, terminology, representative examples, and relation to biofilms.

Week 4	Biofilms: principles, terminology, representative examples, and relation to anaerobic digestion.
Week 5	Anaerobic digestion: principles, terminology, representative examples, and relation to composting.
Week 6	Composting: principles, terminology, representative examples, and relation to microbial degradation.
Week 7	Midterm Exam + Microbial degradation: key concepts, examples, and interpretation.
Week 8	Treatment monitoring: principles, terminology, representative examples, and relation to bioreactor operation.
Week 9	Bioreactor operation: principles, terminology, representative examples, and relation to case studies.
Week 10	Case studies: principles, terminology, representative examples, and relation to bioremediation principles.
Week 11	Bioremediation principles: principles, terminology, representative examples, and relation to wastewater treatment.
Week 12	Wastewater treatment: principles, terminology, representative examples, and relation to activated sludge.
Week 13	Activated sludge: principles, terminology, representative examples, and relation to biofilms.
Week 14	Biofilms: principles, terminology, representative examples, and relation to anaerobic digestion.
Week 15	Integration and revision: applications of anaerobic digestion, composting, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Biological treatment.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to bioremediation principles; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to wastewater treatment; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to activated sludge; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to biofilms; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to anaerobic digestion; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to composting; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to microbial degradation; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to treatment monitoring; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to bioreactor operation; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to case studies; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to bioremediation principles; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to wastewater treatment; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to activated sludge; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to biofilms; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?

Required Texts	Course notes prepared by the Department of Life Sciences and an approved recent textbook in the field.	Yes
Recommended Texts	Recent peer-reviewed articles, laboratory manuals, and open educational resources relevant to the module.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Bacterial toxins سموم بكتيرية		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-36147		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIII	Semester of Delivery	6
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	وقاص سعدي محمود	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	رغد زياد سليمان	Acad. Title / Qualification	Lecturer / Ph.D.
Module Tutor (2) Name	نورا برهان الدين عبد الرحمن	Acad. Title / Qualification	Lecturer / Ph.D.
Module Tutor (3) Name	كريمه علي بحر	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Bacterial toxins and its relevance to Life Sciences. 2. To explain the key principles related to virulence factors, exotoxins, and endotoxin. 3. To develop the ability to connect theoretical concepts of Bacterial toxins with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Bacterial toxins. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Bacterial toxins.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Bacterial toxins (Remember). 2. Describe the main concepts of virulence factors and exotoxins (Understand). 3. Explain the biological significance of endotoxin and toxin genes (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Bacterial toxins (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to toxin mechanisms (Apply). 6. Compare selected examples, methods, or biological systems within Bacterial toxins (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Bacterial toxins (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Bacterial toxins in health, environment,

	biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Bacterial toxins (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Virulence factors: Concepts, terminology, mechanisms, representative examples, and applications related to exotoxins. [SSWL = 12 hrs] Unit 2 — Endotoxin: Concepts, terminology, mechanisms, representative examples, and applications related to toxin genes. [SSWL = 12 hrs] Unit 3 — Toxin mechanisms: Concepts, terminology, mechanisms, representative examples, and applications related to host response. [SSWL = 11 hrs] Unit 4 — Detection assays: Concepts, terminology, mechanisms, representative examples, and applications related to toxoid vaccines. [SSWL = 11 hrs] Unit 5 — Food poisoning toxins: Concepts, terminology, mechanisms, representative examples, and applications related to clinical significance. [SSWL = 11 hrs] Unit 6 — Virulence factors: Concepts, terminology, mechanisms, representative examples, and applications related to exotoxins. [SSWL = 11 hrs] Unit 7 — Endotoxin: Concepts, terminology, mechanisms, representative examples, and applications related to toxin genes. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Bacterial toxins using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Virulence factors: principles, terminology, representative examples, and relation to exotoxins.
Week 2	Exotoxins: principles, terminology, representative examples, and relation to endotoxin.
Week 3	Endotoxin: principles, terminology, representative examples, and relation to toxin genes.

Week 4	Toxin genes: principles, terminology, representative examples, and relation to toxin mechanisms.
Week 5	Toxin mechanisms: principles, terminology, representative examples, and relation to host response.
Week 6	Host response: principles, terminology, representative examples, and relation to detection assays.
Week 7	Midterm Exam + Detection assays: key concepts, examples, and interpretation.
Week 8	Toxoid vaccines: principles, terminology, representative examples, and relation to food poisoning toxins.
Week 9	Food poisoning toxins: principles, terminology, representative examples, and relation to clinical significance.
Week 10	Clinical significance: principles, terminology, representative examples, and relation to virulence factors.
Week 11	Virulence factors: principles, terminology, representative examples, and relation to exotoxins.
Week 12	Exotoxins: principles, terminology, representative examples, and relation to endotoxin.
Week 13	Endotoxin: principles, terminology, representative examples, and relation to toxin genes.
Week 14	Toxin genes: principles, terminology, representative examples, and relation to toxin mechanisms.
Week 15	Integration and revision: applications of toxin mechanisms, host response, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Bacterial toxins.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to virulence factors; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to exotoxins; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to endotoxin; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to toxin genes; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to toxin mechanisms; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to host response; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to detection assays; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to toxoid vaccines; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to food poisoning toxins; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to clinical significance; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to virulence factors; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to exotoxins; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to endotoxin; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to toxin genes; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Madigan et al. Brock Biology of Microorganisms.	Yes

Recommended Texts	Prescott's Microbiology and selected clinical/applied microbiology references.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Antibiotics مضادات حيوية		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-36148		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIII	Semester of Delivery	6
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	ريام فارس صالح	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	سندس جاسم محمد	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (2) Name	هاشم وسام	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Module Tutor (3) Name	Name [يحتاج تعبئة من القسم العلمي]	Acad. Title / Qualification	Academic Title / Qualification
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Antibiotics and its relevance to Life Sciences. 2. To explain the key principles related to antibiotic classes, mechanisms of action, and pharmacodynamics basics. 3. To develop the ability to connect theoretical concepts of Antibiotics with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Antibiotics. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Antibiotics.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Antibiotics (Remember). 2. Describe the main concepts of antibiotic classes and mechanisms of action (Understand). 3. Explain the biological significance of pharmacodynamics basics and resistance mechanisms (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Antibiotics (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to susceptibility testing (Apply). 6. Compare selected examples, methods, or biological systems within Antibiotics (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Antibiotics (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Antibiotics in health, environment,

	biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Antibiotics (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Antibiotic classes: Concepts, terminology, mechanisms, representative examples, and applications related to mechanisms of action. [SSWL = 12 hrs] Unit 2 — Pharmacodynamics basics: Concepts, terminology, mechanisms, representative examples, and applications related to resistance mechanisms. [SSWL = 12 hrs] Unit 3 — Susceptibility testing: Concepts, terminology, mechanisms, representative examples, and applications related to beta-lactams. [SSWL = 11 hrs] Unit 4 — Protein synthesis inhibitors: Concepts, terminology, mechanisms, representative examples, and applications related to antifolates and quinolones. [SSWL = 11 hrs] Unit 5 — Antibiotic stewardship: Concepts, terminology, mechanisms, representative examples, and applications related to new antimicrobial strategies. [SSWL = 11 hrs] Unit 6 — Antibiotic classes: Concepts, terminology, mechanisms, representative examples, and applications related to mechanisms of action. [SSWL = 11 hrs] Unit 7 — Pharmacodynamics basics: Concepts, terminology, mechanisms, representative examples, and applications related to resistance mechanisms. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Antibiotics using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Antibiotic classes: principles, terminology, representative examples, and relation to mechanisms of action.
Week 2	Mechanisms of action: principles, terminology, representative examples, and relation to pharmacodynamics basics.
Week 3	Pharmacodynamics basics: principles, terminology, representative examples, and relation to resistance mechanisms.

Week 4	Resistance mechanisms: principles, terminology, representative examples, and relation to susceptibility testing.
Week 5	Susceptibility testing: principles, terminology, representative examples, and relation to beta-lactams.
Week 6	Beta-lactams: principles, terminology, representative examples, and relation to protein synthesis inhibitors.
Week 7	Midterm Exam + Protein synthesis inhibitors: key concepts, examples, and interpretation.
Week 8	Antifolates and quinolones: principles, terminology, representative examples, and relation to antibiotic stewardship.
Week 9	Antibiotic stewardship: principles, terminology, representative examples, and relation to new antimicrobial strategies.
Week 10	New antimicrobial strategies: principles, terminology, representative examples, and relation to antibiotic classes.
Week 11	Antibiotic classes: principles, terminology, representative examples, and relation to mechanisms of action.
Week 12	Mechanisms of action: principles, terminology, representative examples, and relation to pharmacodynamics basics.
Week 13	Pharmacodynamics basics: principles, terminology, representative examples, and relation to resistance mechanisms.
Week 14	Resistance mechanisms: principles, terminology, representative examples, and relation to susceptibility testing.
Week 15	Integration and revision: applications of susceptibility testing, beta-lactams, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Antibiotics.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to antibiotic classes; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to mechanisms of action; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to pharmacodynamics basics; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to resistance mechanisms; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to susceptibility testing; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to beta-lactams; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to protein synthesis inhibitors; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to antifolates and quinolones; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to antibiotic stewardship; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to new antimicrobial strategies; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to antibiotic classes; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to mechanisms of action; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to pharmacodynamics basics; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to resistance mechanisms; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Madigan et al. Brock Biology of Microorganisms.	Yes
Recommended Texts	Prescott's Microbiology and selected clinical/applied microbiology references.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Hematology علم الدم		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-36149		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIII	Semester of Delivery	6
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	موسى جاسم محمد الحميش	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	موفق مطلك زيدان	Acad. Title / Qualification	Professor / Ph.D.
Module Tutor (2) Name	ريم اديب محمد	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (3) Name	تيسير خليل ابراهيم	Acad. Title / Qualification	Lecturer / Ph.D.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Hematology and its relevance to Life Sciences. 2. To explain the key principles related to blood composition, hematopoiesis, and erythrocytes. 3. To develop the ability to connect theoretical concepts of Hematology with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Hematology. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Hematology.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Hematology (Remember). 2. Describe the main concepts of blood composition and hematopoiesis (Understand). 3. Explain the biological significance of erythrocytes and leukocytes (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Hematology (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to platelets (Apply). 6. Compare selected examples, methods, or biological systems within Hematology (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Hematology (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Hematology in health, environment,

	biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Hematology (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Blood composition: Concepts, terminology, mechanisms, representative examples, and applications related to hematopoiesis. [SSWL = 12 hrs] Unit 2 — Erythrocytes: Concepts, terminology, mechanisms, representative examples, and applications related to leukocytes. [SSWL = 12 hrs] Unit 3 — Platelets: Concepts, terminology, mechanisms, representative examples, and applications related to anemia. [SSWL = 11 hrs] Unit 4 — Leukocyte disorders: Concepts, terminology, mechanisms, representative examples, and applications related to hemostasis. [SSWL = 11 hrs] Unit 5 — Blood grouping: Concepts, terminology, mechanisms, representative examples, and applications related to hematology tests. [SSWL = 11 hrs] Unit 6 — Blood composition: Concepts, terminology, mechanisms, representative examples, and applications related to hematopoiesis. [SSWL = 11 hrs] Unit 7 — Erythrocytes: Concepts, terminology, mechanisms, representative examples, and applications related to leukocytes. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Hematology using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Blood composition: principles, terminology, representative examples, and relation to hematopoiesis.
Week 2	Hematopoiesis: principles, terminology, representative examples, and relation to erythrocytes.
Week 3	Erythrocytes: principles, terminology, representative examples, and relation to leukocytes.

Week 4	Leukocytes: principles, terminology, representative examples, and relation to platelets.
Week 5	Platelets: principles, terminology, representative examples, and relation to anemia.
Week 6	Anemia: principles, terminology, representative examples, and relation to leukocyte disorders.
Week 7	Midterm Exam + Leukocyte disorders: key concepts, examples, and interpretation.
Week 8	Hemostasis: principles, terminology, representative examples, and relation to blood grouping.
Week 9	Blood grouping: principles, terminology, representative examples, and relation to hematology tests.
Week 10	Hematology tests: principles, terminology, representative examples, and relation to blood composition.
Week 11	Blood composition: principles, terminology, representative examples, and relation to hematopoiesis.
Week 12	Hematopoiesis: principles, terminology, representative examples, and relation to erythrocytes.
Week 13	Erythrocytes: principles, terminology, representative examples, and relation to leukocytes.
Week 14	Leukocytes: principles, terminology, representative examples, and relation to platelets.
Week 15	Integration and revision: applications of platelets, anemia, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Hematology.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to blood composition; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to hematopoiesis; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to erythrocytes; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to leukocytes; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to platelets; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to anemia; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to leukocyte disorders; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to hemostasis; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to blood grouping; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to hematology tests; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to blood composition; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to hematopoiesis; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to erythrocytes; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to leukocytes; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Course notes prepared by the Department of Life Sciences and an approved recent textbook in the field.	Yes

Recommended Texts	Recent peer-reviewed articles, laboratory manuals, and open educational resources relevant to the module.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Molecular Biology علم البايولوجي الجزيئي		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-47050		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIV	Semester of Delivery	7
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	عدنان فاضل نصيف	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	معن حسن صالح	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (2) Name	نور معاذ احمد	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (3) Name	أسماء عدنان مرعي محسن	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Molecular Biology and its relevance to Life Sciences. 2. To explain the key principles related to DNA and RNA structure, DNA replication, and transcription. 3. To develop the ability to connect theoretical concepts of Molecular Biology with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Molecular Biology. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Molecular Biology.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Molecular Biology (Remember). 2. Describe the main concepts of DNA and RNA structure and DNA replication (Understand). 3. Explain the biological significance of transcription and RNA processing (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Molecular Biology (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to translation (Apply). 6. Compare selected examples, methods, or biological systems within Molecular Biology (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Molecular Biology (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Molecular Biology in health,

	environment, biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Molecular Biology (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Dna and rna structure: Concepts, terminology, mechanisms, representative examples, and applications related to DNA replication. [SSWL = 12 hrs] Unit 2 — Transcription: Concepts, terminology, mechanisms, representative examples, and applications related to RNA processing. [SSWL = 12 hrs] Unit 3 — Translation: Concepts, terminology, mechanisms, representative examples, and applications related to gene regulation. [SSWL = 11 hrs] Unit 4 — Recombinant dna: Concepts, terminology, mechanisms, representative examples, and applications related to PCR and sequencing. [SSWL = 11 hrs] Unit 5 — Genomics: Concepts, terminology, mechanisms, representative examples, and applications related to molecular diagnostics. [SSWL = 11 hrs] Unit 6 — Dna and rna structure: Concepts, terminology, mechanisms, representative examples, and applications related to DNA replication. [SSWL = 11 hrs] Unit 7 — Transcription: Concepts, terminology, mechanisms, representative examples, and applications related to RNA processing. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Molecular Biology using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Dna and rna structure: principles, terminology, representative examples, and relation to DNA replication.
Week 2	Dna replication: principles, terminology, representative examples, and relation to transcription.
Week 3	Transcription: principles, terminology, representative examples, and relation to RNA processing.

Week 4	Rna processing: principles, terminology, representative examples, and relation to translation.
Week 5	Translation: principles, terminology, representative examples, and relation to gene regulation.
Week 6	Gene regulation: principles, terminology, representative examples, and relation to recombinant DNA.
Week 7	Midterm Exam + Recombinant dna: key concepts, examples, and interpretation.
Week 8	Pcr and sequencing: principles, terminology, representative examples, and relation to genomics.
Week 9	Genomics: principles, terminology, representative examples, and relation to molecular diagnostics.
Week 10	Molecular diagnostics: principles, terminology, representative examples, and relation to DNA and RNA structure.
Week 11	Dna and rna structure: principles, terminology, representative examples, and relation to DNA replication.
Week 12	Dna replication: principles, terminology, representative examples, and relation to transcription.
Week 13	Transcription: principles, terminology, representative examples, and relation to RNA processing.
Week 14	Rna processing: principles, terminology, representative examples, and relation to translation.
Week 15	Integration and revision: applications of translation, gene regulation, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Molecular Biology.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to DNA and RNA structure; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to DNA replication; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to transcription; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to RNA processing; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to translation; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to gene regulation; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to recombinant DNA; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to PCR and sequencing; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to genomics; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to molecular diagnostics; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to DNA and RNA structure; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to DNA replication; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to transcription; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to RNA processing; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?

Required Texts	Watson et al. Molecular Biology of the Gene.	Yes
Recommended Texts	Alberts et al. Molecular Biology of the Cell.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Endocrine glands and hormones غدد صم وهرمونات		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-47051		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIV	Semester of Delivery	7
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	موفق مطلك زيدان	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	ريم اديب محمد	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (2) Name	تيسير خليل ابراهيم	Acad. Title / Qualification	Lecturer / Ph.D.
Module Tutor (3) Name	انس ياسين حسن حمد	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Endocrine glands and hormones and its relevance to Life Sciences. 2. To explain the key principles related to endocrine principles, hypothalamus and pituitary, and thyroid gland. 3. To develop the ability to connect theoretical concepts of Endocrine glands and hormones with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Endocrine glands and hormones. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Endocrine glands and hormones.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Endocrine glands and hormones (Remember). 2. Describe the main concepts of endocrine principles and hypothalamus and pituitary (Understand). 3. Explain the biological significance of thyroid gland and parathyroid and calcium (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Endocrine glands and hormones (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to adrenal gland (Apply). 6. Compare selected examples, methods, or biological systems within Endocrine glands and hormones (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Endocrine glands and hormones (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Endocrine glands and hormones in

	health, environment, biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Endocrine glands and hormones (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Endocrine principles: Concepts, terminology, mechanisms, representative examples, and applications related to hypothalamus and pituitary. [SSWL = 12 hrs] Unit 2 — Thyroid gland: Concepts, terminology, mechanisms, representative examples, and applications related to parathyroid and calcium. [SSWL = 12 hrs] Unit 3 — Adrenal gland: Concepts, terminology, mechanisms, representative examples, and applications related to pancreatic hormones. [SSWL = 11 hrs] Unit 4 — Gonadal hormones: Concepts, terminology, mechanisms, representative examples, and applications related to feedback regulation. [SSWL = 11 hrs] Unit 5 — Endocrine disorders: Concepts, terminology, mechanisms, representative examples, and applications related to hormone assays. [SSWL = 11 hrs] Unit 6 — Endocrine principles: Concepts, terminology, mechanisms, representative examples, and applications related to hypothalamus and pituitary. [SSWL = 11 hrs] Unit 7 — Thyroid gland: Concepts, terminology, mechanisms, representative examples, and applications related to parathyroid and calcium. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Endocrine glands and hormones using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Endocrine principles: principles, terminology, representative examples, and relation to hypothalamus and pituitary.
Week 2	Hypothalamus and pituitary: principles, terminology, representative examples, and relation to thyroid gland.
Week 3	Thyroid gland: principles, terminology, representative examples, and relation to parathyroid and calcium.

Week 4	Parathyroid and calcium: principles, terminology, representative examples, and relation to adrenal gland.
Week 5	Adrenal gland: principles, terminology, representative examples, and relation to pancreatic hormones.
Week 6	Pancreatic hormones: principles, terminology, representative examples, and relation to gonadal hormones.
Week 7	Midterm Exam + Gonadal hormones: key concepts, examples, and interpretation.
Week 8	Feedback regulation: principles, terminology, representative examples, and relation to endocrine disorders.
Week 9	Endocrine disorders: principles, terminology, representative examples, and relation to hormone assays.
Week 10	Hormone assays: principles, terminology, representative examples, and relation to endocrine principles.
Week 11	Endocrine principles: principles, terminology, representative examples, and relation to hypothalamus and pituitary.
Week 12	Hypothalamus and pituitary: principles, terminology, representative examples, and relation to thyroid gland.
Week 13	Thyroid gland: principles, terminology, representative examples, and relation to parathyroid and calcium.
Week 14	Parathyroid and calcium: principles, terminology, representative examples, and relation to adrenal gland.
Week 15	Integration and revision: applications of adrenal gland, pancreatic hormones, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Endocrine glands and hormones.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to endocrine principles; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to hypothalamus and pituitary; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to thyroid gland; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to parathyroid and calcium; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to adrenal gland; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to pancreatic hormones; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to gonadal hormones; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to feedback regulation; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to endocrine disorders; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to hormone assays; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to endocrine principles; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to hypothalamus and pituitary; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to thyroid gland; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to parathyroid and calcium; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Course notes prepared by the Department of Life Sciences and an approved recent textbook in the field.	Yes
Recommended Texts	Recent peer-reviewed articles, laboratory manuals, and open educational resources relevant to the module.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Medical insects حشرات طبيه		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-47052		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIV	Semester of Delivery	7
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	احمد علي عيسى	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	استبرق محمود مهدي	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (2) Name	ضفاف راضي مهدي	Acad. Title / Qualification	Lecturer / M.Sc.
Module Tutor (3) Name	الهام خليف عذاب	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Medical insects and its relevance to Life Sciences. 2. To explain the key principles related to medical entomology principles, mosquitoes, and flies. 3. To develop the ability to connect theoretical concepts of Medical insects with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Medical insects. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Medical insects.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Medical insects (Remember). 2. Describe the main concepts of medical entomology principles and mosquitoes (Understand). 3. Explain the biological significance of flies and lice and fleas (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Medical insects (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to ticks and mites (Apply). 6. Compare selected examples, methods, or biological systems within Medical insects (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Medical insects (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Medical insects in health, environment,

	biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Medical insects (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Medical entomology principles: Concepts, terminology, mechanisms, representative examples, and applications related to mosquitoes. [SSWL = 12 hrs] Unit 2 — Flies: Concepts, terminology, mechanisms, representative examples, and applications related to lice and fleas. [SSWL = 12 hrs] Unit 3 — Ticks and mites: Concepts, terminology, mechanisms, representative examples, and applications related to vector-borne diseases. [SSWL = 11 hrs] Unit 4 — Vector competence: Concepts, terminology, mechanisms, representative examples, and applications related to surveillance. [SSWL = 11 hrs] Unit 5 — Insecticide resistance: Concepts, terminology, mechanisms, representative examples, and applications related to control strategies. [SSWL = 11 hrs] Unit 6 — Medical entomology principles: Concepts, terminology, mechanisms, representative examples, and applications related to mosquitoes. [SSWL = 11 hrs] Unit 7 — Flies: Concepts, terminology, mechanisms, representative examples, and applications related to lice and fleas. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Medical insects using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Medical entomology principles: principles, terminology, representative examples, and relation to mosquitoes.
Week 2	Mosquitoes: principles, terminology, representative examples, and relation to flies.
Week 3	Flies: principles, terminology, representative examples, and relation to lice and fleas.
Week 4	Lice and fleas: principles, terminology, representative examples, and relation to ticks and mites.

Week 5	Ticks and mites: principles, terminology, representative examples, and relation to vector-borne diseases.
Week 6	Vector-borne diseases: principles, terminology, representative examples, and relation to vector competence.
Week 7	Midterm Exam + Vector competence: key concepts, examples, and interpretation.
Week 8	Surveillance: principles, terminology, representative examples, and relation to insecticide resistance.
Week 9	Insecticide resistance: principles, terminology, representative examples, and relation to control strategies.
Week 10	Control strategies: principles, terminology, representative examples, and relation to medical entomology principles.
Week 11	Medical entomology principles: principles, terminology, representative examples, and relation to mosquitoes.
Week 12	Mosquitoes: principles, terminology, representative examples, and relation to flies.
Week 13	Flies: principles, terminology, representative examples, and relation to lice and fleas.
Week 14	Lice and fleas: principles, terminology, representative examples, and relation to ticks and mites.
Week 15	Integration and revision: applications of ticks and mites, vector-borne diseases, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Medical insects.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to medical entomology principles; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to mosquitoes; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to flies; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to lice and fleas; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to ticks and mites; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to vector-borne diseases; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to vector competence; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to surveillance; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to insecticide resistance; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to control strategies; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to medical entomology principles; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to mosquitoes; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to flies; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to lice and fleas; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Course notes prepared by the Department of Life Sciences and an approved recent textbook in the field.	Yes
Recommended Texts	Recent peer-reviewed articles, laboratory manuals, and open educational resources	No

	relevant to the module.	
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Plant metabolism ايض نبات		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-47053		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIV	Semester of Delivery	7
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	احمد هواس عبد الله انيس	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	عبد الودود شاكر محمود	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (2) Name	عثمان بابان عبدالله	Acad. Title / Qualification	Lecturer / Ph.D.
Module Tutor (3) Name	زيدون وليد محمد	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Plant metabolism and its relevance to Life Sciences. 2. To explain the key principles related to primary metabolism, photosynthetic carbon metabolism, and respiration. 3. To develop the ability to connect theoretical concepts of Plant metabolism with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Plant metabolism. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Plant metabolism.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Plant metabolism (Remember). 2. Describe the main concepts of primary metabolism and photosynthetic carbon metabolism (Understand). 3. Explain the biological significance of respiration and nitrogen assimilation (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Plant metabolism (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to sulfur metabolism (Apply). 6. Compare selected examples, methods, or biological systems within Plant metabolism (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Plant metabolism (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Plant metabolism in health,

	environment, biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Plant metabolism (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Primary metabolism: Concepts, terminology, mechanisms, representative examples, and applications related to photosynthetic carbon metabolism. [SSWL = 12 hrs] Unit 2 — Respiration: Concepts, terminology, mechanisms, representative examples, and applications related to nitrogen assimilation. [SSWL = 12 hrs] Unit 3 — Sulfur metabolism: Concepts, terminology, mechanisms, representative examples, and applications related to lipid metabolism. [SSWL = 11 hrs] Unit 4 — Secondary metabolites: Concepts, terminology, mechanisms, representative examples, and applications related to metabolic regulation. [SSWL = 11 hrs] Unit 5 — Stress metabolism: Concepts, terminology, mechanisms, representative examples, and applications related to metabolomics introduction. [SSWL = 11 hrs] Unit 6 — Primary metabolism: Concepts, terminology, mechanisms, representative examples, and applications related to photosynthetic carbon metabolism. [SSWL = 11 hrs] Unit 7 — Respiration: Concepts, terminology, mechanisms, representative examples, and applications related to nitrogen assimilation. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Plant metabolism using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Primary metabolism: principles, terminology, representative examples, and relation to photosynthetic carbon metabolism.
Week 2	Photosynthetic carbon metabolism: principles, terminology, representative examples, and relation to respiration.
Week 3	Respiration: principles, terminology, representative examples, and relation to nitrogen assimilation.

Week 4	Nitrogen assimilation: principles, terminology, representative examples, and relation to sulfur metabolism.
Week 5	Sulfur metabolism: principles, terminology, representative examples, and relation to lipid metabolism.
Week 6	Lipid metabolism: principles, terminology, representative examples, and relation to secondary metabolites.
Week 7	Midterm Exam + Secondary metabolites: key concepts, examples, and interpretation.
Week 8	Metabolic regulation: principles, terminology, representative examples, and relation to stress metabolism.
Week 9	Stress metabolism: principles, terminology, representative examples, and relation to metabolomics introduction.
Week 10	Metabolomics introduction: principles, terminology, representative examples, and relation to primary metabolism.
Week 11	Primary metabolism: principles, terminology, representative examples, and relation to photosynthetic carbon metabolism.
Week 12	Photosynthetic carbon metabolism: principles, terminology, representative examples, and relation to respiration.
Week 13	Respiration: principles, terminology, representative examples, and relation to nitrogen assimilation.
Week 14	Nitrogen assimilation: principles, terminology, representative examples, and relation to sulfur metabolism.
Week 15	Integration and revision: applications of sulfur metabolism, lipid metabolism, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Plant metabolism.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to primary metabolism; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to photosynthetic carbon metabolism; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to respiration; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to nitrogen assimilation; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to sulfur metabolism; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to lipid metabolism; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to secondary metabolites; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to metabolic regulation; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to stress metabolism; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to metabolomics introduction; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to primary metabolism; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to photosynthetic carbon metabolism; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to respiration; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to nitrogen assimilation; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Taiz et al. Plant Physiology and Development / Raven Biology of Plants.	Yes
Recommended Texts	Selected flora, taxonomy, and plant science atlases approved by the department.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Water treatment معالجة مياه		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-47054		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIV	Semester of Delivery	7
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	محمد غضبان فرحان	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	محمد سلمان دلس	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Module Tutor (2) Name	نور صباح سعيد جمعة	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Module Tutor (3) Name	Name [يحتاج تعبئة من القسم العلمي]	Acad. Title / Qualification	Academic Title / Qualification
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Water treatment and its relevance to Life Sciences. 2. To explain the key principles related to water quality parameters, coagulation and flocculation, and sedimentation. 3. To develop the ability to connect theoretical concepts of Water treatment with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Water treatment. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Water treatment.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Water treatment (Remember). 2. Describe the main concepts of water quality parameters and coagulation and flocculation (Understand). 3. Explain the biological significance of sedimentation and filtration (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Water treatment (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to disinfection (Apply). 6. Compare selected examples, methods, or biological systems within Water treatment (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Water treatment (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Water treatment in health,

	environment, biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Water treatment (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Water quality parameters: Concepts, terminology, mechanisms, representative examples, and applications related to coagulation and flocculation. [SSWL = 12 hrs] Unit 2 — Sedimentation: Concepts, terminology, mechanisms, representative examples, and applications related to filtration. [SSWL = 12 hrs] Unit 3 — Disinfection: Concepts, terminology, mechanisms, representative examples, and applications related to biological treatment. [SSWL = 11 hrs] Unit 4 — Advanced oxidation: Concepts, terminology, mechanisms, representative examples, and applications related to desalination basics. [SSWL = 11 hrs] Unit 5 — Sludge handling: Concepts, terminology, mechanisms, representative examples, and applications related to quality monitoring. [SSWL = 11 hrs] Unit 6 — Water quality parameters: Concepts, terminology, mechanisms, representative examples, and applications related to coagulation and flocculation. [SSWL = 11 hrs] Unit 7 — Sedimentation: Concepts, terminology, mechanisms, representative examples, and applications related to filtration. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Water treatment using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Water quality parameters: principles, terminology, representative examples, and relation to coagulation and flocculation.
Week 2	Coagulation and flocculation: principles, terminology, representative examples, and relation to sedimentation.
Week 3	Sedimentation: principles, terminology, representative examples, and relation to filtration.

Week 4	Filtration: principles, terminology, representative examples, and relation to disinfection.
Week 5	Disinfection: principles, terminology, representative examples, and relation to biological treatment.
Week 6	Biological treatment: principles, terminology, representative examples, and relation to advanced oxidation.
Week 7	Midterm Exam + Advanced oxidation: key concepts, examples, and interpretation.
Week 8	Desalination basics: principles, terminology, representative examples, and relation to sludge handling.
Week 9	Sludge handling: principles, terminology, representative examples, and relation to quality monitoring.
Week 10	Quality monitoring: principles, terminology, representative examples, and relation to water quality parameters.
Week 11	Water quality parameters: principles, terminology, representative examples, and relation to coagulation and flocculation.
Week 12	Coagulation and flocculation: principles, terminology, representative examples, and relation to sedimentation.
Week 13	Sedimentation: principles, terminology, representative examples, and relation to filtration.
Week 14	Filtration: principles, terminology, representative examples, and relation to disinfection.
Week 15	Integration and revision: applications of disinfection, biological treatment, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Water treatment.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to water quality parameters; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to coagulation and flocculation; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to sedimentation; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to filtration; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to disinfection; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to biological treatment; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to advanced oxidation; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to desalination basics; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to sludge handling; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to quality monitoring; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to water quality parameters; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to coagulation and flocculation; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to sedimentation; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to filtration; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Course notes prepared by the Department of Life Sciences and an approved recent textbook in the field.	Yes
Recommended Texts	Recent peer-reviewed articles, laboratory manuals, and open educational resources relevant to the module.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Comparative anatomy تشريح مقارن		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-47055		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIV	Semester of Delivery	7
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Academic Title	Module Leader's Qualification	Qualification
Module Tutor (1) Name	Name [يحتاج تعبئة من القسم العلمي]	Acad. Title / Qualification	Academic Title / Qualification
Module Tutor (2) Name	Name [يحتاج تعبئة من القسم العلمي]	Acad. Title / Qualification	Academic Title / Qualification
Module Tutor (3) Name	Name [يحتاج تعبئة من القسم العلمي]	Acad. Title / Qualification	Academic Title / Qualification
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Comparative anatomy and its relevance to Life Sciences. 2. To explain the key principles related to vertebrate body plan, integumentary system, and skeletal system. 3. To develop the ability to connect theoretical concepts of Comparative anatomy with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Comparative anatomy. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Comparative anatomy.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Comparative anatomy (Remember). 2. Describe the main concepts of vertebrate body plan and integumentary system (Understand). 3. Explain the biological significance of skeletal system and muscular system (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Comparative anatomy (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to digestive system (Apply). 6. Compare selected examples, methods, or biological systems within Comparative anatomy (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Comparative anatomy (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Comparative anatomy in health,

	environment, biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Comparative anatomy (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Vertebrate body plan: Concepts, terminology, mechanisms, representative examples, and applications related to integumentary system. [SSWL = 12 hrs] Unit 2 — Skeletal system: Concepts, terminology, mechanisms, representative examples, and applications related to muscular system. [SSWL = 12 hrs] Unit 3 — Digestive system: Concepts, terminology, mechanisms, representative examples, and applications related to respiratory system. [SSWL = 11 hrs] Unit 4 — Circulatory system: Concepts, terminology, mechanisms, representative examples, and applications related to urogenital system. [SSWL = 11 hrs] Unit 5 — Nervous system: Concepts, terminology, mechanisms, representative examples, and applications related to evolutionary adaptations. [SSWL = 11 hrs] Unit 6 — Vertebrate body plan: Concepts, terminology, mechanisms, representative examples, and applications related to integumentary system. [SSWL = 11 hrs] Unit 7 — Skeletal system: Concepts, terminology, mechanisms, representative examples, and applications related to muscular system. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Comparative anatomy using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Vertebrate body plan: principles, terminology, representative examples, and relation to integumentary system.
Week 2	Integumentary system: principles, terminology, representative examples, and relation to skeletal system.
Week 3	Skeletal system: principles, terminology, representative examples, and relation to muscular system.

Week 4	Muscular system: principles, terminology, representative examples, and relation to digestive system.
Week 5	Digestive system: principles, terminology, representative examples, and relation to respiratory system.
Week 6	Respiratory system: principles, terminology, representative examples, and relation to circulatory system.
Week 7	Midterm Exam + Circulatory system: key concepts, examples, and interpretation.
Week 8	Urogenital system: principles, terminology, representative examples, and relation to nervous system.
Week 9	Nervous system: principles, terminology, representative examples, and relation to evolutionary adaptations.
Week 10	Evolutionary adaptations: principles, terminology, representative examples, and relation to vertebrate body plan.
Week 11	Vertebrate body plan: principles, terminology, representative examples, and relation to integumentary system.
Week 12	Integumentary system: principles, terminology, representative examples, and relation to skeletal system.
Week 13	Skeletal system: principles, terminology, representative examples, and relation to muscular system.
Week 14	Muscular system: principles, terminology, representative examples, and relation to digestive system.
Week 15	Integration and revision: applications of digestive system, respiratory system, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Comparative anatomy.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to vertebrate body plan; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to integumentary system; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to skeletal system; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to muscular system; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to digestive system; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to respiratory system; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to circulatory system; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to urogenital system; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to nervous system; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to evolutionary adaptations; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to vertebrate body plan; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to integumentary system; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to skeletal system; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to muscular system; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Hickman et al. Integrated Principles of Zoology.	Yes
Recommended Texts	Relevant zoology, parasitology, and entomology atlases approved by the department.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Genetics Engineering هندسة وراثية		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-48162		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIV	Semester of Delivery	8
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	عدنان فاضل نصيف	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	معن حسن صالح	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (2) Name	نور معاذ حميد	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (3) Name	أسماء عدنان مرعي محسن	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Bio-47050	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. To provide students with a systematic understanding of Genetics Engineering and its relevance to Life Sciences. 2. To explain the key principles related to recombinant DNA principles, restriction enzymes, and vectors. 3. To develop the ability to connect theoretical concepts of Genetics Engineering with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Genetics Engineering. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Genetics Engineering.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Genetics Engineering (Remember). 2. Describe the main concepts of recombinant DNA principles and restriction enzymes (Understand). 3. Explain the biological significance of vectors and cloning strategies (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Genetics Engineering (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to PCR applications (Apply). 6. Compare selected examples, methods, or biological systems within Genetics Engineering (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Genetics Engineering (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Genetics Engineering in health,

	environment, biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Genetics Engineering (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Recombinant dna principles: Concepts, terminology, mechanisms, representative examples, and applications related to restriction enzymes. [SSWL = 12 hrs] Unit 2 — Vectors: Concepts, terminology, mechanisms, representative examples, and applications related to cloning strategies. [SSWL = 12 hrs] Unit 3 — Pcr applications: Concepts, terminology, mechanisms, representative examples, and applications related to gene transfer. [SSWL = 11 hrs] Unit 4 — Genome editing: Concepts, terminology, mechanisms, representative examples, and applications related to transgenic organisms. [SSWL = 11 hrs] Unit 5 — Biosafety and ethics: Concepts, terminology, mechanisms, representative examples, and applications related to molecular screening. [SSWL = 11 hrs] Unit 6 — Recombinant dna principles: Concepts, terminology, mechanisms, representative examples, and applications related to restriction enzymes. [SSWL = 11 hrs] Unit 7 — Vectors: Concepts, terminology, mechanisms, representative examples, and applications related to cloning strategies. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Genetics Engineering using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Recombinant dna principles: principles, terminology, representative examples, and relation to restriction enzymes.
Week 2	Restriction enzymes: principles, terminology, representative examples, and relation to vectors.
Week 3	Vectors: principles, terminology, representative examples, and relation to cloning strategies.

Week 4	Cloning strategies: principles, terminology, representative examples, and relation to PCR applications.
Week 5	Pcr applications: principles, terminology, representative examples, and relation to gene transfer.
Week 6	Gene transfer: principles, terminology, representative examples, and relation to genome editing.
Week 7	Midterm Exam + Genome editing: key concepts, examples, and interpretation.
Week 8	Transgenic organisms: principles, terminology, representative examples, and relation to biosafety and ethics.
Week 9	Biosafety and ethics: principles, terminology, representative examples, and relation to molecular screening.
Week 10	Molecular screening: principles, terminology, representative examples, and relation to recombinant DNA principles.
Week 11	Recombinant dna principles: principles, terminology, representative examples, and relation to restriction enzymes.
Week 12	Restriction enzymes: principles, terminology, representative examples, and relation to vectors.
Week 13	Vectors: principles, terminology, representative examples, and relation to cloning strategies.
Week 14	Cloning strategies: principles, terminology, representative examples, and relation to PCR applications.
Week 15	Integration and revision: applications of PCR applications, gene transfer, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Genetics Engineering.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to recombinant DNA principles; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to restriction enzymes; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to vectors; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to cloning strategies; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to PCR applications; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to gene transfer; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to genome editing; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to transgenic organisms; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to biosafety and ethics; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to molecular screening; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to recombinant DNA principles; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to restriction enzymes; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to vectors; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to cloning strategies; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Course notes prepared by the Department of Life Sciences and an approved recent textbook in the field.	Yes
Recommended Texts	Recent peer-reviewed articles, laboratory manuals, and open educational resources relevant to the module.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Immunity مناعة		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-48163		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	UGIV	Semester of Delivery	8
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Academic Title	Module Leader's Qualification	Qualification
Module Tutor (1) Name	Name [يحتاج تعبئة من القسم العلمي]	Acad. Title / Qualification	Academic Title / Qualification
Module Tutor (2) Name	Name [يحتاج تعبئة من القسم العلمي]	Acad. Title / Qualification	Academic Title / Qualification
Module Tutor (3) Name	Name [يحتاج تعبئة من القسم العلمي]	Acad. Title / Qualification	Academic Title / Qualification
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Immunity and its relevance to Life Sciences. 2. To explain the key principles related to innate and adaptive immunity, lymphoid organs, and antigens and antibodies. 3. To develop the ability to connect theoretical concepts of Immunity with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Immunity. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Immunity.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Immunity (Remember). 2. Describe the main concepts of innate and adaptive immunity and lymphoid organs (Understand). 3. Explain the biological significance of antigens and antibodies and MHC and antigen presentation (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Immunity (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to T cells (Apply). 6. Compare selected examples, methods, or biological systems within Immunity (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Immunity (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Immunity in health, environment,

	biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Immunity (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Innate and adaptive immunity: Concepts, terminology, mechanisms, representative examples, and applications related to lymphoid organs. [SSWL = 12 hrs] Unit 2 — Antigens and antibodies: Concepts, terminology, mechanisms, representative examples, and applications related to MHC and antigen presentation. [SSWL = 12 hrs] Unit 3 — T cells: Concepts, terminology, mechanisms, representative examples, and applications related to B cells. [SSWL = 11 hrs] Unit 4 — Complement: Concepts, terminology, mechanisms, representative examples, and applications related to hypersensitivity. [SSWL = 11 hrs] Unit 5 — Autoimmunity: Concepts, terminology, mechanisms, representative examples, and applications related to vaccines and immunotherapy. [SSWL = 11 hrs] Unit 6 — Innate and adaptive immunity: Concepts, terminology, mechanisms, representative examples, and applications related to lymphoid organs. [SSWL = 11 hrs] Unit 7 — Antigens and antibodies: Concepts, terminology, mechanisms, representative examples, and applications related to MHC and antigen presentation. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Immunity using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Innate and adaptive immunity: principles, terminology, representative examples, and relation to lymphoid organs.
Week 2	Lymphoid organs: principles, terminology, representative examples, and relation to antigens and antibodies.
Week 3	Antigens and antibodies: principles, terminology, representative examples, and relation to MHC and antigen presentation.
Week 4	Mhc and antigen presentation: principles, terminology, representative

	examples, and relation to T cells.
Week 5	T cells: principles, terminology, representative examples, and relation to B cells.
Week 6	B cells: principles, terminology, representative examples, and relation to complement.
Week 7	Midterm Exam + Complement: key concepts, examples, and interpretation.
Week 8	Hypersensitivity: principles, terminology, representative examples, and relation to autoimmunity.
Week 9	Autoimmunity: principles, terminology, representative examples, and relation to vaccines and immunotherapy.
Week 10	Vaccines and immunotherapy: principles, terminology, representative examples, and relation to innate and adaptive immunity.
Week 11	Innate and adaptive immunity: principles, terminology, representative examples, and relation to lymphoid organs.
Week 12	Lymphoid organs: principles, terminology, representative examples, and relation to antigens and antibodies.
Week 13	Antigens and antibodies: principles, terminology, representative examples, and relation to MHC and antigen presentation.
Week 14	Mhc and antigen presentation: principles, terminology, representative examples, and relation to T cells.
Week 15	Integration and revision: applications of T cells, B cells, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Immunity.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to innate and adaptive immunity; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to lymphoid organs; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to antigens and antibodies; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to MHC and antigen presentation; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to T cells; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to B cells; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to complement; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to hypersensitivity; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to autoimmunity; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to vaccines and immunotherapy; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to innate and adaptive immunity; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to lymphoid organs; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to antigens and antibodies; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to MHC and antigen presentation; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?

Required Texts	Murphy, K. & Weaver, C. (2022). Janeway's Immunobiology (10th ed.). Garland Science.	Yes
Recommended Texts	Abbas, Lichtman & Pillai (2021). Cellular and Molecular Immunology.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Tissue culture زراعه نسجية		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-48164		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIV	Semester of Delivery	8
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	احمد هواس عبد الله انيس	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	حيدر مظهر عباس	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (2) Name	عبد الودود شاكر محمود	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (3) Name	عثمان بابان عبدالله	Acad. Title / Qualification	Lecturer / Ph.D.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Tissue culture and its relevance to Life Sciences. 2. To explain the key principles related to tissue culture principles, aseptic technique, and culture media. 3. To develop the ability to connect theoretical concepts of Tissue culture with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Tissue culture. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Tissue culture.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Tissue culture (Remember). 2. Describe the main concepts of tissue culture principles and aseptic technique (Understand). 3. Explain the biological significance of culture media and callus induction (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Tissue culture (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to organogenesis (Apply). 6. Compare selected examples, methods, or biological systems within Tissue culture (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Tissue culture (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Tissue culture in health, environment,

	biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Tissue culture (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Tissue culture principles: Concepts, terminology, mechanisms, representative examples, and applications related to aseptic technique. [SSWL = 12 hrs] Unit 2 — Culture media: Concepts, terminology, mechanisms, representative examples, and applications related to callus induction. [SSWL = 12 hrs] Unit 3 — Organogenesis: Concepts, terminology, mechanisms, representative examples, and applications related to micropropagation. [SSWL = 11 hrs] Unit 4 — Somatic embryogenesis: Concepts, terminology, mechanisms, representative examples, and applications related to protoplast culture. [SSWL = 11 hrs] Unit 5 — Secondary metabolite production: Concepts, terminology, mechanisms, representative examples, and applications related to applications and quality control. [SSWL = 11 hrs] Unit 6 — Tissue culture principles: Concepts, terminology, mechanisms, representative examples, and applications related to aseptic technique. [SSWL = 11 hrs] Unit 7 — Culture media: Concepts, terminology, mechanisms, representative examples, and applications related to callus induction. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Tissue culture using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Tissue culture principles: principles, terminology, representative examples, and relation to aseptic technique.
Week 2	Aseptic technique: principles, terminology, representative examples, and relation to culture media.
Week 3	Culture media: principles, terminology, representative examples, and relation to callus induction.

Week 4	Callus induction: principles, terminology, representative examples, and relation to organogenesis.
Week 5	Organogenesis: principles, terminology, representative examples, and relation to micropropagation.
Week 6	Micropropagation: principles, terminology, representative examples, and relation to somatic embryogenesis.
Week 7	Midterm Exam + Somatic embryogenesis: key concepts, examples, and interpretation.
Week 8	Protoplast culture: principles, terminology, representative examples, and relation to secondary metabolite production.
Week 9	Secondary metabolite production: principles, terminology, representative examples, and relation to applications and quality control.
Week 10	Applications and quality control: principles, terminology, representative examples, and relation to tissue culture principles.
Week 11	Tissue culture principles: principles, terminology, representative examples, and relation to aseptic technique.
Week 12	Aseptic technique: principles, terminology, representative examples, and relation to culture media.
Week 13	Culture media: principles, terminology, representative examples, and relation to callus induction.
Week 14	Callus induction: principles, terminology, representative examples, and relation to organogenesis.
Week 15	Integration and revision: applications of organogenesis, micropropagation, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Tissue culture.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to tissue culture principles; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to aseptic technique; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to culture media; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to callus induction; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to organogenesis; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to micropropagation; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to somatic embryogenesis; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to protoplast culture; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to secondary metabolite production; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to applications and quality control; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to tissue culture principles; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to aseptic technique; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to culture media; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to callus induction; recording results and interpretation.

Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Course notes prepared by the Department of Life Sciences and an approved recent textbook in the field.	Yes
Recommended Texts	Recent peer-reviewed articles, laboratory manuals, and open educational resources relevant to the module.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Pathological analyses تحليلات مرضية		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-48165		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	UGIV	Semester of Delivery	8
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	ريم اديب محمد	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	سيماء عبد الرحمن شعبان	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (2) Name	فراس فارس رجا	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (3) Name	مروة عبد السلام قادر	Acad. Title / Qualification	Assistant Professor / Ph.D.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Bio-47051	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. To provide students with a systematic understanding of Pathological analyses and its relevance to Life Sciences. 2. To explain the key principles related to clinical laboratory safety, sample collection, and hematological tests. 3. To develop the ability to connect theoretical concepts of Pathological analyses with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Pathological analyses. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Pathological analyses.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Pathological analyses (Remember). 2. Describe the main concepts of clinical laboratory safety and sample collection (Understand). 3. Explain the biological significance of hematological tests and urinalysis (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Pathological analyses (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to biochemical tests (Apply). 6. Compare selected examples, methods, or biological systems within Pathological analyses (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Pathological analyses (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Pathological analyses in health,

	environment, biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Pathological analyses (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Clinical laboratory safety: Concepts, terminology, mechanisms, representative examples, and applications related to sample collection. [SSWL = 12 hrs] Unit 2 — Hematological tests: Concepts, terminology, mechanisms, representative examples, and applications related to urinalysis. [SSWL = 12 hrs] Unit 3 — Biochemical tests: Concepts, terminology, mechanisms, representative examples, and applications related to microbiological diagnosis. [SSWL = 11 hrs] Unit 4 — Serological tests: Concepts, terminology, mechanisms, representative examples, and applications related to quality control. [SSWL = 11 hrs] Unit 5 — Interpretation of results: Concepts, terminology, mechanisms, representative examples, and applications related to laboratory reporting. [SSWL = 11 hrs] Unit 6 — Clinical laboratory safety: Concepts, terminology, mechanisms, representative examples, and applications related to sample collection. [SSWL = 11 hrs] Unit 7 — Hematological tests: Concepts, terminology, mechanisms, representative examples, and applications related to urinalysis. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Pathological analyses using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Clinical laboratory safety: principles, terminology, representative examples, and relation to sample collection.
Week 2	Sample collection: principles, terminology, representative examples, and relation to hematological tests.
Week 3	Hematological tests: principles, terminology, representative examples, and relation to urinalysis.

Week 4	Urinalysis: principles, terminology, representative examples, and relation to biochemical tests.
Week 5	Biochemical tests: principles, terminology, representative examples, and relation to microbiological diagnosis.
Week 6	Microbiological diagnosis: principles, terminology, representative examples, and relation to serological tests.
Week 7	Midterm Exam + Serological tests: key concepts, examples, and interpretation.
Week 8	Quality control: principles, terminology, representative examples, and relation to interpretation of results.
Week 9	Interpretation of results: principles, terminology, representative examples, and relation to laboratory reporting.
Week 10	Laboratory reporting: principles, terminology, representative examples, and relation to clinical laboratory safety.
Week 11	Clinical laboratory safety: principles, terminology, representative examples, and relation to sample collection.
Week 12	Sample collection: principles, terminology, representative examples, and relation to hematological tests.
Week 13	Hematological tests: principles, terminology, representative examples, and relation to urinalysis.
Week 14	Urinalysis: principles, terminology, representative examples, and relation to biochemical tests.
Week 15	Integration and revision: applications of biochemical tests, microbiological diagnosis, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Pathological analyses.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to clinical laboratory safety; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to sample collection; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to hematological tests; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to urinalysis; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to biochemical tests; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to microbiological diagnosis; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to serological tests; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to quality control; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to interpretation of results; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to laboratory reporting; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to clinical laboratory safety; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to sample collection; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to hematological tests; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to urinalysis; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Course notes prepared by the Department of Life Sciences and an approved recent textbook in the field.	Yes
Recommended Texts	Recent peer-reviewed articles, laboratory manuals, and open educational resources relevant to the module.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Parasitic worms ديدان طفيلية		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-48166		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIV	Semester of Delivery	8
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	عبد الخالق علوان محيميد	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	الشيماء جاسم محمد	Acad. Title / Qualification	Lecturer / Ph.D.
Module Tutor (2) Name	حنين مهند ماهر جاسم	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Module Tutor (3) Name	ريهام فراس فارس عبد	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Parasitic worms and its relevance to Life Sciences. 2. To explain the key principles related to helminth classification, trematodes, and cestodes. 3. To develop the ability to connect theoretical concepts of Parasitic worms with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Parasitic worms. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Parasitic worms.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Parasitic worms (Remember). 2. Describe the main concepts of helminth classification and trematodes (Understand). 3. Explain the biological significance of cestodes and nematodes (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Parasitic worms (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to life cycles (Apply). 6. Compare selected examples, methods, or biological systems within Parasitic worms (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Parasitic worms (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Parasitic worms in health, environment,

	biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Parasitic worms (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Helminth classification: Concepts, terminology, mechanisms, representative examples, and applications related to trematodes. [SSWL = 12 hrs] Unit 2 — Cestodes: Concepts, terminology, mechanisms, representative examples, and applications related to nematodes. [SSWL = 12 hrs] Unit 3 — Life cycles: Concepts, terminology, mechanisms, representative examples, and applications related to pathogenesis. [SSWL = 11 hrs] Unit 4 — Diagnosis: Concepts, terminology, mechanisms, representative examples, and applications related to treatment principles. [SSWL = 11 hrs] Unit 5 — Epidemiology: Concepts, terminology, mechanisms, representative examples, and applications related to control measures. [SSWL = 11 hrs] Unit 6 — Helminth classification: Concepts, terminology, mechanisms, representative examples, and applications related to trematodes. [SSWL = 11 hrs] Unit 7 — Cestodes: Concepts, terminology, mechanisms, representative examples, and applications related to nematodes. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Parasitic worms using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Helminth classification: principles, terminology, representative examples, and relation to trematodes.
Week 2	Trematodes: principles, terminology, representative examples, and relation to cestodes.
Week 3	Cestodes: principles, terminology, representative examples, and relation to nematodes.

Week 4	Nematodes: principles, terminology, representative examples, and relation to life cycles.
Week 5	Life cycles: principles, terminology, representative examples, and relation to pathogenesis.
Week 6	Pathogenesis: principles, terminology, representative examples, and relation to diagnosis.
Week 7	Midterm Exam + Diagnosis: key concepts, examples, and interpretation.
Week 8	Treatment principles: principles, terminology, representative examples, and relation to epidemiology.
Week 9	Epidemiology: principles, terminology, representative examples, and relation to control measures.
Week 10	Control measures: principles, terminology, representative examples, and relation to helminth classification.
Week 11	Helminth classification: principles, terminology, representative examples, and relation to trematodes.
Week 12	Trematodes: principles, terminology, representative examples, and relation to cestodes.
Week 13	Cestodes: principles, terminology, representative examples, and relation to nematodes.
Week 14	Nematodes: principles, terminology, representative examples, and relation to life cycles.
Week 15	Integration and revision: applications of life cycles, pathogenesis, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Parasitic worms.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to helminth classification; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to trematodes; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to cestodes; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to nematodes; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to life cycles; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to pathogenesis; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to diagnosis; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to treatment principles; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to epidemiology; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to control measures; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to helminth classification; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to trematodes; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to cestodes; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to nematodes; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Hickman et al. Integrated Principles of Zoology.	Yes
Recommended Texts	Relevant zoology, parasitology, and entomology atlases approved by the department.	No
Websites	https://www.ncbi.nlm.nih.gov/books/	Online resources

	https://scholar.google.com https://www.khanacademy.org/science	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Research Project بحث تخرج		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [ ] Seminar
Module Code	Bio-48167		
ECTS Credits	3		
SWL (hr/sem)	75		
Module Level	UGIV	Semester of Delivery	8
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Academic Title	Module Leader's Qualification	Qualification
Module Tutor (1) Name	Name [يحتاج تعبئة من القسم العلمي]	Acad. Title / Qualification	Academic Title / Qualification
Module Tutor (2) Name	Name [يحتاج تعبئة من القسم العلمي]	Acad. Title / Qualification	Academic Title / Qualification
Module Tutor (3) Name	Name [يحتاج تعبئة من القسم العلمي]	Acad. Title / Qualification	Academic Title / Qualification
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Research Project and its relevance to Life Sciences. 2. To explain the key principles related to research ethics, problem identification, and literature review. 3. To develop the ability to connect theoretical concepts of Research Project with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Research Project. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Research Project.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Research Project (Remember). 2. Describe the main concepts of research ethics and problem identification (Understand). 3. Explain the biological significance of literature review and proposal writing (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Research Project (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to methodology (Apply). 6. Compare selected examples, methods, or biological systems within Research Project (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Research Project (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Research Project in health,

	environment, biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Research Project (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Research ethics: Concepts, terminology, mechanisms, representative examples, and applications related to problem identification. [SSWL = 9 hrs] Unit 2 — Literature review: Concepts, terminology, mechanisms, representative examples, and applications related to proposal writing. [SSWL = 9 hrs] Unit 3 — Methodology: Concepts, terminology, mechanisms, representative examples, and applications related to data collection. [SSWL = 9 hrs] Unit 4 — Data analysis: Concepts, terminology, mechanisms, representative examples, and applications related to academic writing. [SSWL = 9 hrs] Unit 5 — Referencing: Concepts, terminology, mechanisms, representative examples, and applications related to presentation and defence. [SSWL = 9 hrs] Unit 6 — Research ethics: Concepts, terminology, mechanisms, representative examples, and applications related to problem identification. [SSWL = 9 hrs] Unit 7 — Literature review: Concepts, terminology, mechanisms, representative examples, and applications related to proposal writing. [SSWL = 9 hrs] Total Structured SWL = 63 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Research Project using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	12	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Research ethics: principles, terminology, representative examples, and relation to problem identification.
Week 2	Problem identification: principles, terminology, representative examples, and relation to literature review.
Week 3	Literature review: principles, terminology, representative examples, and relation to proposal writing.

Week 4	Proposal writing: principles, terminology, representative examples, and relation to methodology.
Week 5	Methodology: principles, terminology, representative examples, and relation to data collection.
Week 6	Data collection: principles, terminology, representative examples, and relation to data analysis.
Week 7	Midterm Exam + Data analysis: key concepts, examples, and interpretation.
Week 8	Academic writing: principles, terminology, representative examples, and relation to referencing.
Week 9	Referencing: principles, terminology, representative examples, and relation to presentation and defence.
Week 10	Presentation and defence: principles, terminology, representative examples, and relation to research ethics.
Week 11	Research ethics: principles, terminology, representative examples, and relation to problem identification.
Week 12	Problem identification: principles, terminology, representative examples, and relation to literature review.
Week 13	Literature review: principles, terminology, representative examples, and relation to proposal writing.
Week 14	Proposal writing: principles, terminology, representative examples, and relation to methodology.
Week 15	Integration and revision: applications of methodology, data collection, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Research Project.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to research ethics; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to problem identification; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to literature review; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to proposal writing; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to methodology; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to data collection; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to data analysis; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to academic writing; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to referencing; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to presentation and defence; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to research ethics; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to problem identification; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to literature review; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to proposal writing; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Creswell, J.W. Research Design: Qualitative, Quantitative, and Mixed Methods Approaches.	Yes
Recommended Texts	University thesis guidelines, journal author instructions, and discipline-specific references.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Molecular Biology علم البايولوجي الجزيئي		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-47056		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIV	Semester of Delivery	7
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	عدنان فاضل نصيف	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	معن حسن صالح	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (2) Name	نور معاذ احمد	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (3) Name	أسماء عدنان مرعي محسن	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Molecular Biology and its relevance to Life Sciences. 2. To explain the key principles related to DNA and RNA structure, DNA replication, and transcription. 3. To develop the ability to connect theoretical concepts of Molecular Biology with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Molecular Biology. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Molecular Biology.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Molecular Biology (Remember). 2. Describe the main concepts of DNA and RNA structure and DNA replication (Understand). 3. Explain the biological significance of transcription and RNA processing (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Molecular Biology (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to translation (Apply). 6. Compare selected examples, methods, or biological systems within Molecular Biology (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Molecular Biology (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Molecular Biology in health,

	environment, biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Molecular Biology (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Dna and rna structure: Concepts, terminology, mechanisms, representative examples, and applications related to DNA replication. [SSWL = 12 hrs] Unit 2 — Transcription: Concepts, terminology, mechanisms, representative examples, and applications related to RNA processing. [SSWL = 12 hrs] Unit 3 — Translation: Concepts, terminology, mechanisms, representative examples, and applications related to gene regulation. [SSWL = 11 hrs] Unit 4 — Recombinant dna: Concepts, terminology, mechanisms, representative examples, and applications related to PCR and sequencing. [SSWL = 11 hrs] Unit 5 — Genomics: Concepts, terminology, mechanisms, representative examples, and applications related to molecular diagnostics. [SSWL = 11 hrs] Unit 6 — Dna and rna structure: Concepts, terminology, mechanisms, representative examples, and applications related to DNA replication. [SSWL = 11 hrs] Unit 7 — Transcription: Concepts, terminology, mechanisms, representative examples, and applications related to RNA processing. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Molecular Biology using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Dna and rna structure: principles, terminology, representative examples, and relation to DNA replication.
Week 2	Dna replication: principles, terminology, representative examples, and relation to transcription.
Week 3	Transcription: principles, terminology, representative examples, and relation to RNA processing.

Week 4	Rna processing: principles, terminology, representative examples, and relation to translation.
Week 5	Translation: principles, terminology, representative examples, and relation to gene regulation.
Week 6	Gene regulation: principles, terminology, representative examples, and relation to recombinant DNA.
Week 7	Midterm Exam + Recombinant dna: key concepts, examples, and interpretation.
Week 8	Pcr and sequencing: principles, terminology, representative examples, and relation to genomics.
Week 9	Genomics: principles, terminology, representative examples, and relation to molecular diagnostics.
Week 10	Molecular diagnostics: principles, terminology, representative examples, and relation to DNA and RNA structure.
Week 11	Dna and rna structure: principles, terminology, representative examples, and relation to DNA replication.
Week 12	Dna replication: principles, terminology, representative examples, and relation to transcription.
Week 13	Transcription: principles, terminology, representative examples, and relation to RNA processing.
Week 14	Rna processing: principles, terminology, representative examples, and relation to translation.
Week 15	Integration and revision: applications of translation, gene regulation, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Molecular Biology.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to DNA and RNA structure; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to DNA replication; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to transcription; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to RNA processing; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to translation; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to gene regulation; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to recombinant DNA; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to PCR and sequencing; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to genomics; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to molecular diagnostics; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to DNA and RNA structure; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to DNA replication; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to transcription; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to RNA processing; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?

Required Texts	Watson et al. Molecular Biology of the Gene.	Yes
Recommended Texts	Alberts et al. Molecular Biology of the Cell.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Food Microbiology احياء مجهرية غذائية		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-47057		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIV	Semester of Delivery	7
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	سرا حميد نايف	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	مروة حسن عبد الوهاب	Acad. Title / Qualification	Professor / Ph.D.
Module Tutor (2) Name	انتصار عبد الجبار شمخي	Acad. Title / Qualification	Lecturer / M.Sc.
Module Tutor (3) Name	وسام فوزي حميد	Acad. Title / Qualification	Lecturer / Ph.D.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Food Microbiology and its relevance to Life Sciences. 2. To explain the key principles related to microbes in foods, food spoilage, and foodborne pathogens. 3. To develop the ability to connect theoretical concepts of Food Microbiology with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Food Microbiology. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Food Microbiology.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Food Microbiology (Remember). 2. Describe the main concepts of microbes in foods and food spoilage (Understand). 3. Explain the biological significance of foodborne pathogens and fermented foods (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Food Microbiology (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to microbial quality testing (Apply). 6. Compare selected examples, methods, or biological systems within Food Microbiology (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Food Microbiology (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Food Microbiology in health,

	environment, biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Food Microbiology (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Microbes in foods: Concepts, terminology, mechanisms, representative examples, and applications related to food spoilage. [SSWL = 12 hrs] Unit 2 — Foodborne pathogens: Concepts, terminology, mechanisms, representative examples, and applications related to fermented foods. [SSWL = 12 hrs] Unit 3 — Microbial quality testing: Concepts, terminology, mechanisms, representative examples, and applications related to HACCP. [SSWL = 11 hrs] Unit 4 — Preservation methods: Concepts, terminology, mechanisms, representative examples, and applications related to probiotics. [SSWL = 11 hrs] Unit 5 — Food safety regulations: Concepts, terminology, mechanisms, representative examples, and applications related to industrial applications. [SSWL = 11 hrs] Unit 6 — Microbes in foods: Concepts, terminology, mechanisms, representative examples, and applications related to food spoilage. [SSWL = 11 hrs] Unit 7 — Foodborne pathogens: Concepts, terminology, mechanisms, representative examples, and applications related to fermented foods. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Food Microbiology using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Microbes in foods: principles, terminology, representative examples, and relation to food spoilage.
Week 2	Food spoilage: principles, terminology, representative examples, and relation to foodborne pathogens.
Week 3	Foodborne pathogens: principles, terminology, representative examples, and relation to fermented foods.

Week 4	Fermented foods: principles, terminology, representative examples, and relation to microbial quality testing.
Week 5	Microbial quality testing: principles, terminology, representative examples, and relation to HACCP.
Week 6	Haccp: principles, terminology, representative examples, and relation to preservation methods.
Week 7	Midterm Exam + Preservation methods: key concepts, examples, and interpretation.
Week 8	Probiotics: principles, terminology, representative examples, and relation to food safety regulations.
Week 9	Food safety regulations: principles, terminology, representative examples, and relation to industrial applications.
Week 10	Industrial applications: principles, terminology, representative examples, and relation to microbes in foods.
Week 11	Microbes in foods: principles, terminology, representative examples, and relation to food spoilage.
Week 12	Food spoilage: principles, terminology, representative examples, and relation to foodborne pathogens.
Week 13	Foodborne pathogens: principles, terminology, representative examples, and relation to fermented foods.
Week 14	Fermented foods: principles, terminology, representative examples, and relation to microbial quality testing.
Week 15	Integration and revision: applications of microbial quality testing, HACCP, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Food Microbiology.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to microbes in foods; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to food spoilage; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to foodborne pathogens; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to fermented foods; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to microbial quality testing; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to HACCP; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to preservation methods; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to probiotics; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to food safety regulations; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to industrial applications; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to microbes in foods; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to food spoilage; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to foodborne pathogens; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to fermented foods; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?

Required Texts	Madigan et al. Brock Biology of Microorganisms.	Yes
Recommended Texts	Prescott's Microbiology and selected clinical/applied microbiology references.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Pathological bacteria بكتريا مرضية		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-47058		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIV	Semester of Delivery	7
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	قناة محمود عطية	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	أرشد مهدي حمد	Acad. Title / Qualification	Lecturer / Ph.D.
Module Tutor (2) Name	رغد زياد سليمان	Acad. Title / Qualification	Lecturer / Ph.D.
Module Tutor (3) Name	لبنى اركان يونس عيسى	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Pathological bacteria and its relevance to Life Sciences. 2. To explain the key principles related to bacterial pathogenesis, Gram-positive pathogens, and Gram-negative pathogens. 3. To develop the ability to connect theoretical concepts of Pathological bacteria with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Pathological bacteria. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Pathological bacteria.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Pathological bacteria (Remember). 2. Describe the main concepts of bacterial pathogenesis and Gram-positive pathogens (Understand). 3. Explain the biological significance of Gram-negative pathogens and respiratory infections (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Pathological bacteria (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to enteric infections (Apply). 6. Compare selected examples, methods, or biological systems within Pathological bacteria (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Pathological bacteria (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Pathological bacteria in health,

	environment, biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Pathological bacteria (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Bacterial pathogenesis: Concepts, terminology, mechanisms, representative examples, and applications related to Gram-positive pathogens. [SSWL = 12 hrs] Unit 2 — Gram-negative pathogens: Concepts, terminology, mechanisms, representative examples, and applications related to respiratory infections. [SSWL = 12 hrs] Unit 3 — Enteric infections: Concepts, terminology, mechanisms, representative examples, and applications related to urinary infections. [SSWL = 11 hrs] Unit 4 — Wound infections: Concepts, terminology, mechanisms, representative examples, and applications related to diagnostic culture. [SSWL = 11 hrs] Unit 5 — Antimicrobial susceptibility: Concepts, terminology, mechanisms, representative examples, and applications related to infection control. [SSWL = 11 hrs] Unit 6 — Bacterial pathogenesis: Concepts, terminology, mechanisms, representative examples, and applications related to Gram-positive pathogens. [SSWL = 11 hrs] Unit 7 — Gram-negative pathogens: Concepts, terminology, mechanisms, representative examples, and applications related to respiratory infections. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Pathological bacteria using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Bacterial pathogenesis: principles, terminology, representative examples, and relation to Gram-positive pathogens.
Week 2	Gram-positive pathogens: principles, terminology, representative examples, and relation to Gram-negative pathogens.
Week 3	Gram-negative pathogens: principles, terminology, representative examples, and relation to respiratory infections.

Week 4	Respiratory infections: principles, terminology, representative examples, and relation to enteric infections.
Week 5	Enteric infections: principles, terminology, representative examples, and relation to urinary infections.
Week 6	Urinary infections: principles, terminology, representative examples, and relation to wound infections.
Week 7	Midterm Exam + Wound infections: key concepts, examples, and interpretation.
Week 8	Diagnostic culture: principles, terminology, representative examples, and relation to antimicrobial susceptibility.
Week 9	Antimicrobial susceptibility: principles, terminology, representative examples, and relation to infection control.
Week 10	Infection control: principles, terminology, representative examples, and relation to bacterial pathogenesis.
Week 11	Bacterial pathogenesis: principles, terminology, representative examples, and relation to Gram-positive pathogens.
Week 12	Gram-positive pathogens: principles, terminology, representative examples, and relation to Gram-negative pathogens.
Week 13	Gram-negative pathogens: principles, terminology, representative examples, and relation to respiratory infections.
Week 14	Respiratory infections: principles, terminology, representative examples, and relation to enteric infections.
Week 15	Integration and revision: applications of enteric infections, urinary infections, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Pathological bacteria.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to bacterial pathogenesis; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to Gram-positive pathogens; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to Gram-negative pathogens; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to respiratory infections; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to enteric infections; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to urinary infections; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to wound infections; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to diagnostic culture; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to antimicrobial susceptibility; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to infection control; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to bacterial pathogenesis; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to Gram-positive pathogens; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to Gram-negative pathogens; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to respiratory infections; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Madigan et al. Brock Biology of Microorganisms.	Yes
Recommended Texts	Prescott's Microbiology and selected clinical/applied microbiology references.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Viruses فايروسات		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-47059		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIV	Semester of Delivery	7
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	وقاص سعدي محمود	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	أرشد مهدي حمد	Acad. Title / Qualification	Lecturer / Ph.D.
Module Tutor (2) Name	نورا برهان الدين عبد الرحمن	Acad. Title / Qualification	Lecturer / Ph.D.
Module Tutor (3) Name	كريمه علي بحر	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Viruses and its relevance to Life Sciences. 2. To explain the key principles related to virus structure, classification, and replication strategies. 3. To develop the ability to connect theoretical concepts of Viruses with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Viruses. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Viruses.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Viruses (Remember). 2. Describe the main concepts of virus structure and classification (Understand). 3. Explain the biological significance of replication strategies and DNA viruses (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Viruses (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to RNA viruses (Apply). 6. Compare selected examples, methods, or biological systems within Viruses (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Viruses (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Viruses in health, environment,

	biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Viruses (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Virus structure: Concepts, terminology, mechanisms, representative examples, and applications related to classification. [SSWL = 12 hrs] Unit 2 — Replication strategies: Concepts, terminology, mechanisms, representative examples, and applications related to DNA viruses. [SSWL = 12 hrs] Unit 3 — Rna viruses: Concepts, terminology, mechanisms, representative examples, and applications related to viral genetics. [SSWL = 11 hrs] Unit 4 — Pathogenesis: Concepts, terminology, mechanisms, representative examples, and applications related to immune response. [SSWL = 11 hrs] Unit 5 — Diagnosis: Concepts, terminology, mechanisms, representative examples, and applications related to antiviral control. [SSWL = 11 hrs] Unit 6 — Virus structure: Concepts, terminology, mechanisms, representative examples, and applications related to classification. [SSWL = 11 hrs] Unit 7 — Replication strategies: Concepts, terminology, mechanisms, representative examples, and applications related to DNA viruses. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Viruses using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Virus structure: principles, terminology, representative examples, and relation to classification.
Week 2	Classification: principles, terminology, representative examples, and relation to replication strategies.
Week 3	Replication strategies: principles, terminology, representative examples, and relation to DNA viruses.

Week 4	Dna viruses: principles, terminology, representative examples, and relation to RNA viruses.
Week 5	Rna viruses: principles, terminology, representative examples, and relation to viral genetics.
Week 6	Viral genetics: principles, terminology, representative examples, and relation to pathogenesis.
Week 7	Midterm Exam + Pathogenesis: key concepts, examples, and interpretation.
Week 8	Immune response: principles, terminology, representative examples, and relation to diagnosis.
Week 9	Diagnosis: principles, terminology, representative examples, and relation to antiviral control.
Week 10	Antiviral control: principles, terminology, representative examples, and relation to virus structure.
Week 11	Virus structure: principles, terminology, representative examples, and relation to classification.
Week 12	Classification: principles, terminology, representative examples, and relation to replication strategies.
Week 13	Replication strategies: principles, terminology, representative examples, and relation to DNA viruses.
Week 14	Dna viruses: principles, terminology, representative examples, and relation to RNA viruses.
Week 15	Integration and revision: applications of RNA viruses, viral genetics, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Viruses.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to virus structure; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to classification; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to replication strategies; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to DNA viruses; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to RNA viruses; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to viral genetics; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to pathogenesis; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to immune response; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to diagnosis; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to antiviral control; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to virus structure; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to classification; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to replication strategies; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to DNA viruses; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Madigan et al. Brock Biology of Microorganisms.	Yes
Recommended Texts	Prescott's Microbiology and selected clinical/applied microbiology references.	No

Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Classification of bacteria تصنيف بكتريا		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-47060		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIV	Semester of Delivery	7
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	هالة عبد الخالق عوض	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	لينا قيس ياسين	Acad. Title / Qualification	Assistant Professor / Qualification
Module Tutor (2) Name	نورا برهان الدين عبد الرحمن	Acad. Title / Qualification	Lecturer / Ph.D.
Module Tutor (3) Name	وسام فوزي حميد	Acad. Title / Qualification	Lecturer / Ph.D.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Classification of bacteria and its relevance to Life Sciences. 2. To explain the key principles related to bacterial taxonomy, phenotypic classification, and staining and morphology. 3. To develop the ability to connect theoretical concepts of Classification of bacteria with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Classification of bacteria. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Classification of bacteria.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Classification of bacteria (Remember). 2. Describe the main concepts of bacterial taxonomy and phenotypic classification (Understand). 3. Explain the biological significance of staining and morphology and biochemical tests (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Classification of bacteria (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to serotyping (Apply). 6. Compare selected examples, methods, or biological systems within Classification of bacteria (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Classification of bacteria (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Classification of bacteria in health,

	environment, biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Classification of bacteria (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Bacterial taxonomy: Concepts, terminology, mechanisms, representative examples, and applications related to phenotypic classification. [SSWL = 12 hrs] Unit 2 — Staining and morphology: Concepts, terminology, mechanisms, representative examples, and applications related to biochemical tests. [SSWL = 12 hrs] Unit 3 — Serotyping: Concepts, terminology, mechanisms, representative examples, and applications related to molecular identification. [SSWL = 11 hrs] Unit 4 — 16s rrna analysis: Concepts, terminology, mechanisms, representative examples, and applications related to phylogenetics. [SSWL = 11 hrs] Unit 5 — Bergey's manual: Concepts, terminology, mechanisms, representative examples, and applications related to taxonomic reporting. [SSWL = 11 hrs] Unit 6 — Bacterial taxonomy: Concepts, terminology, mechanisms, representative examples, and applications related to phenotypic classification. [SSWL = 11 hrs] Unit 7 — Staining and morphology: Concepts, terminology, mechanisms, representative examples, and applications related to biochemical tests. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Classification of bacteria using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Bacterial taxonomy: principles, terminology, representative examples, and relation to phenotypic classification.
Week 2	Phenotypic classification: principles, terminology, representative examples, and relation to staining and morphology.
Week 3	Staining and morphology: principles, terminology, representative examples, and relation to biochemical tests.

Week 4	Biochemical tests: principles, terminology, representative examples, and relation to serotyping.
Week 5	Serotyping: principles, terminology, representative examples, and relation to molecular identification.
Week 6	Molecular identification: principles, terminology, representative examples, and relation to 16S rRNA analysis.
Week 7	Midterm Exam + 16s rrna analysis: key concepts, examples, and interpretation.
Week 8	Phylogenetics: principles, terminology, representative examples, and relation to Bergey's Manual.
Week 9	Bergey's manual: principles, terminology, representative examples, and relation to taxonomic reporting.
Week 10	Taxonomic reporting: principles, terminology, representative examples, and relation to bacterial taxonomy.
Week 11	Bacterial taxonomy: principles, terminology, representative examples, and relation to phenotypic classification.
Week 12	Phenotypic classification: principles, terminology, representative examples, and relation to staining and morphology.
Week 13	Staining and morphology: principles, terminology, representative examples, and relation to biochemical tests.
Week 14	Biochemical tests: principles, terminology, representative examples, and relation to serotyping.
Week 15	Integration and revision: applications of serotyping, molecular identification, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Classification of bacteria.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to bacterial taxonomy; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to phenotypic classification; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to staining and morphology; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to biochemical tests; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to serotyping; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to molecular identification; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to 16S rRNA analysis; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to phylogenetics; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to Bergey's Manual; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to taxonomic reporting; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to bacterial taxonomy; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to phenotypic classification; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to staining and morphology; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to biochemical tests; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Madigan et al. Brock Biology of Microorganisms.	Yes
Recommended Texts	Prescott's Microbiology and selected clinical/applied microbiology references.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Immunity مناعة		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-47061		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIV	Semester of Delivery	7
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	محمد نظير معروف	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	اياد مقداد غيدان	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (2) Name	سيماء عبد الرحمن شعبان	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (3) Name	مروة عبد السلام قادر	Acad. Title / Qualification	Assistant Professor / M.Sc.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Immunity and its relevance to Life Sciences. 2. To explain the key principles related to innate and adaptive immunity, lymphoid organs, and antigens and antibodies. 3. To develop the ability to connect theoretical concepts of Immunity with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Immunity. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Immunity.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Immunity (Remember). 2. Describe the main concepts of innate and adaptive immunity and lymphoid organs (Understand). 3. Explain the biological significance of antigens and antibodies and MHC and antigen presentation (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Immunity (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to T cells (Apply). 6. Compare selected examples, methods, or biological systems within Immunity (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Immunity (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Immunity in health, environment,

	biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Immunity (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Innate and adaptive immunity: Concepts, terminology, mechanisms, representative examples, and applications related to lymphoid organs. [SSWL = 12 hrs] Unit 2 — Antigens and antibodies: Concepts, terminology, mechanisms, representative examples, and applications related to MHC and antigen presentation. [SSWL = 12 hrs] Unit 3 — T cells: Concepts, terminology, mechanisms, representative examples, and applications related to B cells. [SSWL = 11 hrs] Unit 4 — Complement: Concepts, terminology, mechanisms, representative examples, and applications related to hypersensitivity. [SSWL = 11 hrs] Unit 5 — Autoimmunity: Concepts, terminology, mechanisms, representative examples, and applications related to vaccines and immunotherapy. [SSWL = 11 hrs] Unit 6 — Innate and adaptive immunity: Concepts, terminology, mechanisms, representative examples, and applications related to lymphoid organs. [SSWL = 11 hrs] Unit 7 — Antigens and antibodies: Concepts, terminology, mechanisms, representative examples, and applications related to MHC and antigen presentation. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Immunity using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Innate and adaptive immunity: principles, terminology, representative examples, and relation to lymphoid organs.
Week 2	Lymphoid organs: principles, terminology, representative examples, and relation to antigens and antibodies.
Week 3	Antigens and antibodies: principles, terminology, representative examples, and relation to MHC and antigen presentation.
Week 4	Mhc and antigen presentation: principles, terminology, representative

	examples, and relation to T cells.
Week 5	T cells: principles, terminology, representative examples, and relation to B cells.
Week 6	B cells: principles, terminology, representative examples, and relation to complement.
Week 7	Midterm Exam + Complement: key concepts, examples, and interpretation.
Week 8	Hypersensitivity: principles, terminology, representative examples, and relation to autoimmunity.
Week 9	Autoimmunity: principles, terminology, representative examples, and relation to vaccines and immunotherapy.
Week 10	Vaccines and immunotherapy: principles, terminology, representative examples, and relation to innate and adaptive immunity.
Week 11	Innate and adaptive immunity: principles, terminology, representative examples, and relation to lymphoid organs.
Week 12	Lymphoid organs: principles, terminology, representative examples, and relation to antigens and antibodies.
Week 13	Antigens and antibodies: principles, terminology, representative examples, and relation to MHC and antigen presentation.
Week 14	Mhc and antigen presentation: principles, terminology, representative examples, and relation to T cells.
Week 15	Integration and revision: applications of T cells, B cells, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Immunity.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to innate and adaptive immunity; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to lymphoid organs; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to antigens and antibodies; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to MHC and antigen presentation; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to T cells; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to B cells; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to complement; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to hypersensitivity; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to autoimmunity; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to vaccines and immunotherapy; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to innate and adaptive immunity; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to lymphoid organs; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to antigens and antibodies; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to MHC and antigen presentation; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?

Required Texts	Murphy, K. & Weaver, C. (2022). Janeway's Immunobiology (10th ed.). Garland Science.	Yes
Recommended Texts	Abbas, Lichtman & Pillai (2021). Cellular and Molecular Immunology.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Genetics Engineering هندسة وراثية		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-48168		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIV	Semester of Delivery	8
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	عدنان فاضل نصيف	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	معن حسن صالح	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (2) Name	نور معاذ حميد	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (3) Name	أسماء عدنان مرعي محسن	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Bio-47056	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. To provide students with a systematic understanding of Genetics Engineering and its relevance to Life Sciences. 2. To explain the key principles related to recombinant DNA principles, restriction enzymes, and vectors. 3. To develop the ability to connect theoretical concepts of Genetics Engineering with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Genetics Engineering. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Genetics Engineering.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Genetics Engineering (Remember). 2. Describe the main concepts of recombinant DNA principles and restriction enzymes (Understand). 3. Explain the biological significance of vectors and cloning strategies (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Genetics Engineering (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to PCR applications (Apply). 6. Compare selected examples, methods, or biological systems within Genetics Engineering (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Genetics Engineering (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Genetics Engineering in health,

	environment, biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Genetics Engineering (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Recombinant dna principles: Concepts, terminology, mechanisms, representative examples, and applications related to restriction enzymes. [SSWL = 12 hrs] Unit 2 — Vectors: Concepts, terminology, mechanisms, representative examples, and applications related to cloning strategies. [SSWL = 12 hrs] Unit 3 — Pcr applications: Concepts, terminology, mechanisms, representative examples, and applications related to gene transfer. [SSWL = 11 hrs] Unit 4 — Genome editing: Concepts, terminology, mechanisms, representative examples, and applications related to transgenic organisms. [SSWL = 11 hrs] Unit 5 — Biosafety and ethics: Concepts, terminology, mechanisms, representative examples, and applications related to molecular screening. [SSWL = 11 hrs] Unit 6 — Recombinant dna principles: Concepts, terminology, mechanisms, representative examples, and applications related to restriction enzymes. [SSWL = 11 hrs] Unit 7 — Vectors: Concepts, terminology, mechanisms, representative examples, and applications related to cloning strategies. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Genetics Engineering using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Recombinant dna principles: principles, terminology, representative examples, and relation to restriction enzymes.
Week 2	Restriction enzymes: principles, terminology, representative examples, and relation to vectors.
Week 3	Vectors: principles, terminology, representative examples, and relation to cloning strategies.

Week 4	Cloning strategies: principles, terminology, representative examples, and relation to PCR applications.
Week 5	Pcr applications: principles, terminology, representative examples, and relation to gene transfer.
Week 6	Gene transfer: principles, terminology, representative examples, and relation to genome editing.
Week 7	Midterm Exam + Genome editing: key concepts, examples, and interpretation.
Week 8	Transgenic organisms: principles, terminology, representative examples, and relation to biosafety and ethics.
Week 9	Biosafety and ethics: principles, terminology, representative examples, and relation to molecular screening.
Week 10	Molecular screening: principles, terminology, representative examples, and relation to recombinant DNA principles.
Week 11	Recombinant dna principles: principles, terminology, representative examples, and relation to restriction enzymes.
Week 12	Restriction enzymes: principles, terminology, representative examples, and relation to vectors.
Week 13	Vectors: principles, terminology, representative examples, and relation to cloning strategies.
Week 14	Cloning strategies: principles, terminology, representative examples, and relation to PCR applications.
Week 15	Integration and revision: applications of PCR applications, gene transfer, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Genetics Engineering.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to recombinant DNA principles; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to restriction enzymes; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to vectors; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to cloning strategies; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to PCR applications; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to gene transfer; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to genome editing; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to transgenic organisms; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to biosafety and ethics; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to molecular screening; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to recombinant DNA principles; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to restriction enzymes; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to vectors; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to cloning strategies; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Course notes prepared by the Department of Life Sciences and an approved recent textbook in the field.	Yes
Recommended Texts	Recent peer-reviewed articles, laboratory manuals, and open educational resources relevant to the module.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Industrial microbiology احياء مجهرية صناعية		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-48169		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	UGIV	Semester of Delivery	8
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	سرا حميد نايف	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	مروة حسن عبد الوهاب	Acad. Title / Qualification	Professor / Ph.D.
Module Tutor (2) Name	انتصار عبد الجبار شمخي	Acad. Title / Qualification	Lecturer / Ph.D.
Module Tutor (3) Name	محمد احمد	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Bio-47057	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. To provide students with a systematic understanding of Industrial microbiology and its relevance to Life Sciences. 2. To explain the key principles related to industrial microorganisms, strain improvement, and fermentation systems. 3. To develop the ability to connect theoretical concepts of Industrial microbiology with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Industrial microbiology. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Industrial microbiology.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Industrial microbiology (Remember). 2. Describe the main concepts of industrial microorganisms and strain improvement (Understand). 3. Explain the biological significance of fermentation systems and bioreactors (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Industrial microbiology (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to downstream processing (Apply). 6. Compare selected examples, methods, or biological systems within Industrial microbiology (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Industrial microbiology (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Industrial microbiology in health,

	environment, biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Industrial microbiology (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Industrial microorganisms: Concepts, terminology, mechanisms, representative examples, and applications related to strain improvement. [SSWL = 12 hrs] Unit 2 — Fermentation systems: Concepts, terminology, mechanisms, representative examples, and applications related to bioreactors. [SSWL = 12 hrs] Unit 3 — Downstream processing: Concepts, terminology, mechanisms, representative examples, and applications related to enzyme production. [SSWL = 11 hrs] Unit 4 — Antibiotic production: Concepts, terminology, mechanisms, representative examples, and applications related to organic acids. [SSWL = 11 hrs] Unit 5 — Quality control: Concepts, terminology, mechanisms, representative examples, and applications related to scale-up and biosafety. [SSWL = 11 hrs] Unit 6 — Industrial microorganisms: Concepts, terminology, mechanisms, representative examples, and applications related to strain improvement. [SSWL = 11 hrs] Unit 7 — Fermentation systems: Concepts, terminology, mechanisms, representative examples, and applications related to bioreactors. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Industrial microbiology using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Industrial microorganisms: principles, terminology, representative examples, and relation to strain improvement.
Week 2	Strain improvement: principles, terminology, representative examples, and relation to fermentation systems.
Week 3	Fermentation systems: principles, terminology, representative examples, and relation to bioreactors.

Week 4	Bioreactors: principles, terminology, representative examples, and relation to downstream processing.
Week 5	Downstream processing: principles, terminology, representative examples, and relation to enzyme production.
Week 6	Enzyme production: principles, terminology, representative examples, and relation to antibiotic production.
Week 7	Midterm Exam + Antibiotic production: key concepts, examples, and interpretation.
Week 8	Organic acids: principles, terminology, representative examples, and relation to quality control.
Week 9	Quality control: principles, terminology, representative examples, and relation to scale-up and biosafety.
Week 10	Scale-up and biosafety: principles, terminology, representative examples, and relation to industrial microorganisms.
Week 11	Industrial microorganisms: principles, terminology, representative examples, and relation to strain improvement.
Week 12	Strain improvement: principles, terminology, representative examples, and relation to fermentation systems.
Week 13	Fermentation systems: principles, terminology, representative examples, and relation to bioreactors.
Week 14	Bioreactors: principles, terminology, representative examples, and relation to downstream processing.
Week 15	Integration and revision: applications of downstream processing, enzyme production, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Industrial microbiology.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to industrial microorganisms; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to strain improvement; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to fermentation systems; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to bioreactors; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to downstream processing; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to enzyme production; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to antibiotic production; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to organic acids; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to quality control; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to scale-up and biosafety; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to industrial microorganisms; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to strain improvement; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to fermentation systems; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to bioreactors; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Madigan et al. Brock Biology of Microorganisms.	Yes
Recommended Texts	Prescott's Microbiology and selected clinical/applied microbiology references.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Patho analyses تحليلات مرضية		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-48170		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIV	Semester of Delivery	8
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	ريم اديب محمد	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	سيماء عبد الرحمن شعبان	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (2) Name	فراس فارس رجا	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (3) Name	مروة عبد السلام قادر	Acad. Title / Qualification	Assistant Professor / Ph.D.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Pathological analyses and its relevance to Life Sciences. 2. To explain the key principles related to clinical laboratory safety, sample collection, and hematological tests. 3. To develop the ability to connect theoretical concepts of Pathological analyses with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Pathological analyses. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Pathological analyses.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Pathological analyses (Remember). 2. Describe the main concepts of clinical laboratory safety and sample collection (Understand). 3. Explain the biological significance of hematological tests and urinalysis (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Pathological analyses (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to biochemical tests (Apply). 6. Compare selected examples, methods, or biological systems within Pathological analyses (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Pathological analyses (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Pathological analyses in health,

	environment, biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Pathological analyses (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Clinical laboratory safety: Concepts, terminology, mechanisms, representative examples, and applications related to sample collection. [SSWL = 12 hrs] Unit 2 — Hematological tests: Concepts, terminology, mechanisms, representative examples, and applications related to urinalysis. [SSWL = 12 hrs] Unit 3 — Biochemical tests: Concepts, terminology, mechanisms, representative examples, and applications related to microbiological diagnosis. [SSWL = 11 hrs] Unit 4 — Serological tests: Concepts, terminology, mechanisms, representative examples, and applications related to quality control. [SSWL = 11 hrs] Unit 5 — Interpretation of results: Concepts, terminology, mechanisms, representative examples, and applications related to laboratory reporting. [SSWL = 11 hrs] Unit 6 — Clinical laboratory safety: Concepts, terminology, mechanisms, representative examples, and applications related to sample collection. [SSWL = 11 hrs] Unit 7 — Hematological tests: Concepts, terminology, mechanisms, representative examples, and applications related to urinalysis. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Pathological analyses using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Clinical laboratory safety: principles, terminology, representative examples, and relation to sample collection.
Week 2	Sample collection: principles, terminology, representative examples, and relation to hematological tests.
Week 3	Hematological tests: principles, terminology, representative examples, and relation to urinalysis.

Week 4	Urinalysis: principles, terminology, representative examples, and relation to biochemical tests.
Week 5	Biochemical tests: principles, terminology, representative examples, and relation to microbiological diagnosis.
Week 6	Microbiological diagnosis: principles, terminology, representative examples, and relation to serological tests.
Week 7	Midterm Exam + Serological tests: key concepts, examples, and interpretation.
Week 8	Quality control: principles, terminology, representative examples, and relation to interpretation of results.
Week 9	Interpretation of results: principles, terminology, representative examples, and relation to laboratory reporting.
Week 10	Laboratory reporting: principles, terminology, representative examples, and relation to clinical laboratory safety.
Week 11	Clinical laboratory safety: principles, terminology, representative examples, and relation to sample collection.
Week 12	Sample collection: principles, terminology, representative examples, and relation to hematological tests.
Week 13	Hematological tests: principles, terminology, representative examples, and relation to urinalysis.
Week 14	Urinalysis: principles, terminology, representative examples, and relation to biochemical tests.
Week 15	Integration and revision: applications of biochemical tests, microbiological diagnosis, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Pathological analyses.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to clinical laboratory safety; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to sample collection; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to hematological tests; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to urinalysis; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to biochemical tests; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to microbiological diagnosis; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to serological tests; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to quality control; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to interpretation of results; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to laboratory reporting; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to clinical laboratory safety; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to sample collection; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to hematological tests; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to urinalysis; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Course notes prepared by the Department of Life Sciences and an approved recent textbook in the field.	Yes
Recommended Texts	Recent peer-reviewed articles, laboratory manuals, and open educational resources relevant to the module.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Microbiological inheritance وراثة احياء مجهرية		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-48171		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	UGIV	Semester of Delivery	8
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	هالة عبد الخالق عوض	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	لينا قيس ياسين	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (2) Name	كريمه علي بحر	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Module Tutor (3) Name	محمد احمد	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Microbiological inheritance and its relevance to Life Sciences. 2. To explain the key principles related to microbial genetic material, mutation, and DNA repair. 3. To develop the ability to connect theoretical concepts of Microbiological inheritance with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Microbiological inheritance. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Microbiological inheritance.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Microbiological inheritance (Remember). 2. Describe the main concepts of microbial genetic material and mutation (Understand). 3. Explain the biological significance of DNA repair and plasmids (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Microbiological inheritance (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to conjugation (Apply). 6. Compare selected examples, methods, or biological systems within Microbiological inheritance (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Microbiological inheritance (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse).

	9. Evaluate the importance of Microbiological inheritance in health, environment, biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Microbiological inheritance (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Microbial genetic material: Concepts, terminology, mechanisms, representative examples, and applications related to mutation. [SSWL = 12 hrs] Unit 2 — Dna repair: Concepts, terminology, mechanisms, representative examples, and applications related to plasmids. [SSWL = 12 hrs] Unit 3 — Conjugation: Concepts, terminology, mechanisms, representative examples, and applications related to transformation. [SSWL = 11 hrs] Unit 4 — Transduction: Concepts, terminology, mechanisms, representative examples, and applications related to transposons. [SSWL = 11 hrs] Unit 5 — Gene regulation: Concepts, terminology, mechanisms, representative examples, and applications related to horizontal gene transfer. [SSWL = 11 hrs] Unit 6 — Microbial genetic material: Concepts, terminology, mechanisms, representative examples, and applications related to mutation. [SSWL = 11 hrs] Unit 7 — Dna repair: Concepts, terminology, mechanisms, representative examples, and applications related to plasmids. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Microbiological inheritance using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Microbial genetic material: principles, terminology, representative examples, and relation to mutation.
Week 2	Mutation: principles, terminology, representative examples, and relation to DNA repair.
Week 3	Dna repair: principles, terminology, representative examples, and

	relation to plasmids.
Week 4	Plasmids: principles, terminology, representative examples, and relation to conjugation.
Week 5	Conjugation: principles, terminology, representative examples, and relation to transformation.
Week 6	Transformation: principles, terminology, representative examples, and relation to transduction.
Week 7	Midterm Exam + Transduction: key concepts, examples, and interpretation.
Week 8	Transposons: principles, terminology, representative examples, and relation to gene regulation.
Week 9	Gene regulation: principles, terminology, representative examples, and relation to horizontal gene transfer.
Week 10	Horizontal gene transfer: principles, terminology, representative examples, and relation to microbial genetic material.
Week 11	Microbial genetic material: principles, terminology, representative examples, and relation to mutation.
Week 12	Mutation: principles, terminology, representative examples, and relation to DNA repair.
Week 13	Dna repair: principles, terminology, representative examples, and relation to plasmids.
Week 14	Plasmids: principles, terminology, representative examples, and relation to conjugation.
Week 15	Integration and revision: applications of conjugation, transformation, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Microbiological inheritance.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to microbial genetic material; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to mutation; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to DNA repair; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to plasmids; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to conjugation; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to transformation; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to transduction; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to transposons; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to gene regulation; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to horizontal gene transfer; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to microbial genetic material; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to mutation; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to DNA repair; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to plasmids; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Course notes prepared by the Department of Life Sciences and an approved recent textbook in the field.	Yes
Recommended Texts	Recent peer-reviewed articles, laboratory	No

	manuals, and open educational resources relevant to the module.	
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Medicinal fungi فطريات طبية		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [X] Seminar
Module Code	Bio-48172		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIV	Semester of Delivery	8
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	سارا قحطان سليمان	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor (1) Name	همام سعدي حسين علي	Acad. Title / Qualification	Assistant Professor / Ph.D.
Module Tutor (2) Name	اسراء	Acad. Title / Qualification	Lecturer / Ph.D.
Module Tutor (3) Name	رند سلوان نعمان	Acad. Title / Qualification	Assistant Lecturer / M.Sc.
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Medicinal fungi and its relevance to Life Sciences. 2. To explain the key principles related to medically important fungi, dermatophytes, and Candida and yeasts. 3. To develop the ability to connect theoretical concepts of Medicinal fungi with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Medicinal fungi. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Medicinal fungi.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Medicinal fungi (Remember). 2. Describe the main concepts of medically important fungi and dermatophytes (Understand). 3. Explain the biological significance of Candida and yeasts and Aspergillus (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Medicinal fungi (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to dimorphic fungi (Apply). 6. Compare selected examples, methods, or biological systems within Medicinal fungi (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Medicinal fungi (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Medicinal fungi in health, environment,

	biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Medicinal fungi (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Medically important fungi: Concepts, terminology, mechanisms, representative examples, and applications related to dermatophytes. [SSWL = 12 hrs] Unit 2 — Candida and yeasts: Concepts, terminology, mechanisms, representative examples, and applications related to Aspergillus. [SSWL = 12 hrs] Unit 3 — Dimorphic fungi: Concepts, terminology, mechanisms, representative examples, and applications related to opportunistic infections. [SSWL = 11 hrs] Unit 4 — Mycotoxins: Concepts, terminology, mechanisms, representative examples, and applications related to diagnostic methods. [SSWL = 11 hrs] Unit 5 — Antifungal agents: Concepts, terminology, mechanisms, representative examples, and applications related to infection control. [SSWL = 11 hrs] Unit 6 — Medically important fungi: Concepts, terminology, mechanisms, representative examples, and applications related to dermatophytes. [SSWL = 11 hrs] Unit 7 — Candida and yeasts: Concepts, terminology, mechanisms, representative examples, and applications related to Aspergillus. [SSWL = 11 hrs] Total Structured SWL = 79 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Medicinal fungi using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Medically important fungi: principles, terminology, representative examples, and relation to dermatophytes.
Week 2	Dermatophytes: principles, terminology, representative examples, and relation to Candida and yeasts.
Week 3	Candida and yeasts: principles, terminology, representative examples, and relation to Aspergillus.

Week 4	Aspergillus: principles, terminology, representative examples, and relation to dimorphic fungi.
Week 5	Dimorphic fungi: principles, terminology, representative examples, and relation to opportunistic infections.
Week 6	Opportunistic infections: principles, terminology, representative examples, and relation to mycotoxins.
Week 7	Midterm Exam + Mycotoxins: key concepts, examples, and interpretation.
Week 8	Diagnostic methods: principles, terminology, representative examples, and relation to antifungal agents.
Week 9	Antifungal agents: principles, terminology, representative examples, and relation to infection control.
Week 10	Infection control: principles, terminology, representative examples, and relation to medically important fungi.
Week 11	Medically important fungi: principles, terminology, representative examples, and relation to dermatophytes.
Week 12	Dermatophytes: principles, terminology, representative examples, and relation to Candida and yeasts.
Week 13	Candida and yeasts: principles, terminology, representative examples, and relation to Aspergillus.
Week 14	Aspergillus: principles, terminology, representative examples, and relation to dimorphic fungi.
Week 15	Integration and revision: applications of dimorphic fungi, opportunistic infections, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Medicinal fungi.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to medically important fungi; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to dermatophytes; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to Candida and yeasts; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to Aspergillus; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to dimorphic fungi; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to opportunistic infections; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to mycotoxins; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to diagnostic methods; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to antifungal agents; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to infection control; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to medically important fungi; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to dermatophytes; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to Candida and yeasts; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to Aspergillus; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Course notes prepared by the Department of Life Sciences and an approved recent textbook in the field.	Yes
Recommended Texts	Recent peer-reviewed articles, laboratory manuals, and open educational resources relevant to the module.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
Success Group (50 - 100)	B - Very Good	جيد جداً	80 - 89	Above average with some errors
Success Group (50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
Success Group (50 - 100)	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
Success Group (50 - 100)	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 may be awarded
Fail Group (0 – 49)	F – Fail	راسب	0 - 44	Considerable amount of work required
Note: Marks with decimal places above or below 0.5 will be rounded to the higher or lower full mark according to university regulations.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Research Project بحث تخرج		Module Delivery
Module Type	Core		[X] Theory [X] Lecture [X] Lab [ ] Tutorial [ ] Practical [ ] Seminar
Module Code	Bio-48173		
ECTS Credits	3		
SWL (hr/sem)	75		
Module Level	UGIV	Semester of Delivery	8
Administering Department	Life Sciences / علوم الحياة	College	College of Science / كلية العلوم
Module Leader Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Module Leader's Acad. Title	Academic Title	Module Leader's Qualification	Qualification
Module Tutor (1) Name	Name [يحتاج تعبئة من القسم العلمي]	Acad. Title / Qualification	Academic Title / Qualification
Module Tutor (2) Name	Name [يحتاج تعبئة من القسم العلمي]	Acad. Title / Qualification	Academic Title / Qualification
Module Tutor (3) Name	Name [يحتاج تعبئة من القسم العلمي]	Acad. Title / Qualification	Academic Title / Qualification
Peer Reviewer Name	Name [يحتاج تعبئة من القسم العلمي]	e-mail	[يحتاج تعبئة من القسم العلمي]
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide students with a systematic understanding of Research Project and its relevance to Life Sciences. 2. To explain the key principles related to research ethics, problem identification, and literature review. 3. To develop the ability to connect theoretical concepts of Research Project with biological and laboratory applications. 4. To train students to interpret scientific data, specimens, or case examples related to Research Project. 5. To strengthen academic communication, safety awareness, and ethical practice within the context of Research Project.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Bloom's taxonomy levels are considered (Remember → Create) 1. Define the fundamental terminology and scope of Research Project (Remember). 2. Describe the main concepts of research ethics and problem identification (Understand). 3. Explain the biological significance of literature review and proposal writing (Understand). 4. Identify relevant structures, processes, organisms, or analytical tools associated with Research Project (Apply). 5. Apply appropriate laboratory or problem-solving procedures related to methodology (Apply). 6. Compare selected examples, methods, or biological systems within Research Project (Analyse). 7. Analyse experimental observations and relate them to theoretical principles of Research Project (Analyse). 8. Interpret results using accepted scientific terminology and reporting standards (Apply/Analyse). 9. Evaluate the importance of Research Project in health,

	environment, biotechnology, or biological research (Evaluate). 10. Prepare a concise scientific report or presentation based on selected topics in Research Project (Create).
Indicative Contents المحتويات الإرشادية	Unit 1 — Research ethics: Concepts, terminology, mechanisms, representative examples, and applications related to problem identification. [SSWL = 9 hrs] Unit 2 — Literature review: Concepts, terminology, mechanisms, representative examples, and applications related to proposal writing. [SSWL = 9 hrs] Unit 3 — Methodology: Concepts, terminology, mechanisms, representative examples, and applications related to data collection. [SSWL = 9 hrs] Unit 4 — Data analysis: Concepts, terminology, mechanisms, representative examples, and applications related to academic writing. [SSWL = 9 hrs] Unit 5 — Referencing: Concepts, terminology, mechanisms, representative examples, and applications related to presentation and defence. [SSWL = 9 hrs] Unit 6 — Research ethics: Concepts, terminology, mechanisms, representative examples, and applications related to problem identification. [SSWL = 9 hrs] Unit 7 — Literature review: Concepts, terminology, mechanisms, representative examples, and applications related to proposal writing. [SSWL = 9 hrs] Total Structured SWL = 63 hrs

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module employs interactive lectures, guided discussion, and structured laboratory sessions. Lectures introduce the scientific foundations of Research Project using diagrams, case examples, and short formative questions. Laboratory sessions develop practical skills in observation, measurement, specimen handling, data recording, and safe practice. Students are encouraged to complete pre-lab reading, participate in group interpretation of results, and submit concise reports that connect observations with theory.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	12	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation تقييم المادة الدراسية					
As	Assessment	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2, #3
Formative assessment	Assignments	2	10% (10)	3 and 12	LO #4, #5, #6
Formative assessment	Projects / Lab.	1	10% (10)	Continuous	All
Formative assessment	Report	1	10% (10)	13	LO #7, #8, #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 – #6
Summative assessment	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
Week	Material Covered
Week 1	Research ethics: principles, terminology, representative examples, and relation to problem identification.
Week 2	Problem identification: principles, terminology, representative examples, and relation to literature review.
Week 3	Literature review: principles, terminology, representative examples, and relation to proposal writing.

Week 4	Proposal writing: principles, terminology, representative examples, and relation to methodology.
Week 5	Methodology: principles, terminology, representative examples, and relation to data collection.
Week 6	Data collection: principles, terminology, representative examples, and relation to data analysis.
Week 7	Midterm Exam + Data analysis: key concepts, examples, and interpretation.
Week 8	Academic writing: principles, terminology, representative examples, and relation to referencing.
Week 9	Referencing: principles, terminology, representative examples, and relation to presentation and defence.
Week 10	Presentation and defence: principles, terminology, representative examples, and relation to research ethics.
Week 11	Research ethics: principles, terminology, representative examples, and relation to problem identification.
Week 12	Problem identification: principles, terminology, representative examples, and relation to literature review.
Week 13	Literature review: principles, terminology, representative examples, and relation to proposal writing.
Week 14	Proposal writing: principles, terminology, representative examples, and relation to methodology.
Week 15	Integration and revision: applications of methodology, data collection, and preparation for final assessment.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
Week	Material Covered
Lab 1	Laboratory safety, biosafety, equipment familiarisation, and scientific record keeping for Research Project.
Lab 2	Practical 1: observation, demonstration, measurement, or data analysis related to research ethics; recording results and interpretation.
Lab 3	Practical 2: observation, demonstration, measurement, or data analysis related to problem identification; recording results and interpretation.
Lab 4	Practical 3: observation, demonstration, measurement, or data analysis related to literature review; recording results and interpretation.
Lab 5	Practical 4: observation, demonstration, measurement, or data analysis related to proposal writing; recording results and interpretation.
Lab 6	Practical 5: observation, demonstration, measurement, or data analysis related to methodology; recording results and interpretation.
Lab 7	Practical 6: observation, demonstration, measurement, or data analysis related to data collection; recording results and interpretation.
Lab 8	Practical 7: observation, demonstration, measurement, or data analysis related to data analysis; recording results and interpretation.
Lab 9	Practical 8: observation, demonstration, measurement, or data analysis related to academic writing; recording results and interpretation.
Lab 10	Practical 9: observation, demonstration, measurement, or data analysis related to referencing; recording results and interpretation.
Lab 11	Practical 10: observation, demonstration, measurement, or data analysis related to presentation and defence; recording results and interpretation.
Lab 12	Practical 11: observation, demonstration, measurement, or data analysis related to research ethics; recording results and interpretation.
Lab 13	Practical 12: observation, demonstration, measurement, or data analysis related to problem identification; recording results and interpretation.
Lab 14	Practical 13: observation, demonstration, measurement, or data analysis related to literature review; recording results and interpretation.
Lab 15	Practical 14: observation, demonstration, measurement, or data analysis related to proposal writing; recording results and interpretation.
Lab 16	Preparatory week before the final practical/final examination.

Learning and Teaching Resources مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Creswell, J.W. Research Design: Qualitative, Quantitative, and Mixed Methods Approaches.	Yes
Recommended Texts	University thesis guidelines, journal author instructions, and discipline-specific references.	No
Websites	https://www.ncbi.nlm.nih.gov/books/ https://scholar.google.com https://www.khanacademy.org/science	Online resources

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