

Academic Program Description Form

University Name: University of Diyala
Faculty/Institute: College of Science
Scientific Department: Biology
Academic or Professional Program Name: BSc.
Assis. Prof Dr. Esam Hamid Hameed
Final Certificate Name: BSc. in Biology
Academic System: Bologna Process
Description Preparation Date: 5/9/2025
File Completion Date: 5/9/2025

Signature:

Head of Department Name:

Assis. Prof. Esam Hamid Hameed

Date: 10/9/2025

Signature:

Scientific Associate Name:

Prof. Dr. Munther Hamza Rathi

Date: 10/9/2025

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance

Ghassan Sabeeh Mahmood

Approval of the Dean
Prof. Dr. Taha Mohammed Hasan

University of Diyala
جامعة ديالى



First Cycle – Bachelor's Degree (B.Sc.) – Biology
بكالوريوس - علوم حياة



2025/2026

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1. Mission & Vision Statement

Vision Statement

Opportunities for high-level training are available for the students enrolled in the Department of Biology, to prepare them to enter the labor market after graduation to work in the medical laboratories, teaching in the secondary schools, and working in the agricultural enterprises, environmental affairs, water resources and other institutions that have relationships with biological sciences in one way or another. The combination of instructional methods leads students to a balanced understanding of the scientific methods used by biologists to make observations, develop insights and create theories about the living organisms that populate our planet. Small class sizes within the biology program foster a close working relationship between academic staff and students in an informal and nurturing atmosphere.

Mission Statement

The biology academic staff pursues a multifaceted charge at Diyala University. The Program seeks to provide all biology students with fundamental knowledge of biology, as well as a deeper understanding of a selected focus area within the biological sciences. The curriculum and advising have been designed to prepare graduates for their professional future, whether they choose to work as field biologists specializing in botany or wildlife, or to pursue advanced degrees in the life sciences or health sciences. The biology program also provides the necessary fundamental knowledge of the life sciences to support the Nursing degree, the Environmental Studies degree, and the Associate of Science degree in Forest Technology. In addition, biology courses provide a key laboratory science experience for those students seeking to complete the general education requirements.

2. Program Specification

Programme code:	BSc-Bio	ECTS	240
Duration:	4 levels, 8 Semesters	Method of Attendance:	Full Time

Biology means the study of life. It is an exciting, wonderful and rapidly developing subject. Biology play an important role in overcoming the global challenges from disease to environment of the earth. The programme puts a strong emphasis on research and academic skills training across all years. The BSc in Biology is designed to provide students with a solid foundation in fundamentals aspects of plant, animal, ecology, genetics and microbiology. The programme provide skills in laboratory and practical skills that are appropriate to the study of living organisms. The programme is also designed to provide students with a wide-ranging exposure to the theory and practice of the courses, as well as an education in its diverse applications in medicine, industry, and environment.

Biology graduates are qualified for many different types of careers. The breadth of biology studied will determine the opportunities available, but regardless of the path chosen, students will have acquired a broad variety of subject-specific and general abilities that are applicable to jobs in both the biological and non-biological domains.

To graduate, a student shall have undergone 8 semesters of study including summer practical training. Course workload must meet the graduation requirements of the University based on minimum academic standards. The student must earn a minimum of 240 ECTS for the four-year programme.

Level one is focusing on fundamental topics such as Zoology, Botany, Chemistry, Biophysics and Mathematics. Level two will cover a range of concepts including biological systems and the importance of biology in real life. The students will explore topics such as Biochemistry, Entomology, Microbiology, Parasitology, Plant Taxonomy and Anatomy allowing them to develop their interests at a higher level. During level three and four, the students will study in-depth courses provide them an opportunities to learn specialist topics such as biotechnology, molecular biology, pathogenic bacteria, medical virology, pollution, histology and immunology. In the fourth year, more emphasis is placed on student centred learning exercises, workshops, and seminars. Year 4 has a compulsory undertaking a research project/dissertation.

3. Program Objectives

1. A comprehensive study of biological sciences, their applications and uses in society theoretically, scientifically and applicability.
2. Preparation of scientific cadres to work in the fields of medicine and health, agricultural and food industries.
3. Providing the students with the necessary scientific techniques and how to deal with devices and equipments that can be used in theoretical and applied studies.
4. Providing the state institutions, private and mixed sectors (medical, industrial and laboratory institutions) with specialized cadres.
5. Investigate and study the new developments in the biological sciences and keep updated with the scientific developments in this field and incorporate that within the prescribed curriculum.
6. To prepare students for a wide variety of post-baccalaureate paths, including graduate school, professional training programs, or entry level jobs in any area of biology.

4. Student Learning Outcomes

Biology is the study of the organization and operation of life at the molecular, cellular, organism, and population levels. Graduates obtain information on the historical, technical and social aspects of biology and utilize basic knowledge toward realizing broader concepts. The Department offers a Bachelor of Science in Biology with a concentration in General Biology; Pre-medicine / Pre-dentistry; Biotechnology/Molecular Biology and a minor in Secondary Education that leads to a Public Instruction License. Additionally, the Department offers courses to a large number of students from other departments and supports pre-professional programs. The Biology curriculum and experiences are designed to prepare students, in part, for entry into professional health programs, graduate studies, technical careers and education.

1. Graduates will be able to illustrate the structure and function cellular components and explain how they interact in a living cell.
2. Graduates will be able to formally communicate the results of biological investigations using both oral and written communication skills.
3. Graduates will be able to perform laboratory experiments and field studies, by using scientific equipment and computer technology while observing appropriate safety protocols.
4. Graduates will be able to demonstrate a balanced including the historical development of foundational concept of how scientific knowledge develops, theories and laws and the nature of science.
5. Graduates will be able to demonstrate scientific quantitative skills, such as the ability to conduct simple data analyses.
6. Graduates will be able to use critical-thinking and problem-solving skills to develop a research project and/or paper.

5. Academic Staff

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6. Credits, Grading and GPA

Credits

Diyala University is following the Bologna Process with the European Credit Transfer System (ECTS) credit system. The total degree program number of ECTS is 240, 30 ECTS per semester. 1 ECTS is equivalent to 25 hrs student workload, including structured and unstructured workload.

Grading

Before the evaluation, the results are divided into two subgroups: pass and fail. Therefore, the results are independent of the students who failed a course. The grading system is defined as follows:

GRADING SCHEME				
مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب - قيد المعالجة	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note:				
Number Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Calculation of the Cumulative Grade Point Average (CGPA):

The CGPA is calculated by the summation of each module score multiplied by its ECTS, all are divided by the program total ECTS.

CGPA of a 4-year B.Sc. degree:

$$\text{CGPA} = [(1^{\text{st}} \text{ module score} \times \text{ECTS}) + (2^{\text{nd}} \text{ module score} \times \text{ECTS}) + \dots] / 240$$

Curriculum/Modules

Semester 1 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
Bio-1101	General Zoology	78	72	6.00	C	
Bio-1102	Analytical Chemistry	78	72	6.00	C	
Bio-1103	General Mathematics	60	65	5.00	B	
Bio-1104	Biophysics	77	90	6.00	B	
UNI-1105	Human Rights and Democracy	32	27	3.00	S	
UNI-1106	Arabic Language	62	37	4.00	S	

Semester 2 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
Bio-1201	General Botany	78	96	7.00	C	
Bio-1212	Organic Chemistry	78	96	7.00	C	Bio-1102
Bio-1213	Biostatistics	65	65	5.00	B	Bio-1103
Bio-1204	Safety and Biosecurity	48	27	3.00	S	
Sci-1205	Computer Science	62	36	4.00	B	
UNI-1206	English Language	62	37	4.00	S	

Contact

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Program Coordinator:

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**Ministry of Higher Education and Scientific Research
University of Diyala
College of Science
Department of Biology**



**MODULE DESCRIPTION FORM
FIRST CYCLE
LEVEL ONE**

**وصف المقرر لمسار بولونيا
المستوى الاول
الدورة الاولى**

2025/2026

Semester One

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	General Zoology		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	Bio-1101		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	1	Semester of Delivery	
Administering Department	Department of Biology	College	College of Sciences
Module Leader	Ragad Ibrahim Ahmed	e-mail	raghadibrahim@uodiyala.edu.iq
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	1/9/2025	Version Number	2

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. Understand the difference between science and non-science. 2. Be familiar with the specialized vocabulary of zoology. 3. Understand the relationship between animal structure and function. 4. Know the structural and functional characteristics of major animal groups, and be familiar with current hypotheses concerning how they evolved.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Define general zoology. 2. Studying the relationship between zoology and other sciences 3. An introduction to basic concepts in biology through study of the major lineages of invertebrate and vertebrate animals, with emphasis on the structure, and function of organ systems in an evolutionary context 4. Topics covered will include basic cell structure and function, development, systematics, and evolution . 5. Studying the classification or taxonomy of zoology. 6. The laboratory will focus on observation of structural-functional relationships of living and preserved representatives of the major animal phyla.
Indicative Contents المحتويات الإرشادية	Cognitive goals: 1. At the first level, knowledge development is to develop the student's ability to recall what he learned from zoology.

Semester One

	2. The second level: improving comprehension, developing the ability to interpret. 3. Developing application capabilities in detecting classification of zoology 4. The fourth level: giving the student the ability to analyze 5. The fifth level is to develop the student's ability to integrate ideas (synthesis). 6. The sixth level of evaluation is to give a judgment on the value of the material. b- Marathi goals: To improve the student's ability to observe, to learn imitation and simulation, to learn the method of experimentation. B - The soft skills objectives of the course. B1 - knowledge skills – remembering. B2 - Memory and analysis skills. B3 - Use and development skills.
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	1. Lecture method, use of the interactive whiteboard, presentation, and use of explanatory films - explanation and clarification 2. Asking students a set of questions about animal classification, phylum, family, order, and class during the lectures, such as what, how, when and why for specific topics.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ 15 اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	INTRODUCTION : define of general zoology and its relationship with other sciences
Week 2	Characteristics of living things
Week 3	Prokaryotic and eukaryotic cells
Week 4	Cell cycle, Mitosis
Week 5	Animal cells and animal tissues
Week 6	Taxonomy and Classification of Animals
Week 7	Mid-term Exam
Week 8	Animal Phyla,1. The Protozoa
Week 9	2. The Parazoa
Week 10	3. The Radiata
Week 11	4. The Acoelomates
Week 12	5. The Pseudocoelomates
Week 13	6. The Coelomates: Protostomes
Week 14	7. The Coelomates: Deuterostome
Week 15	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي المختبر

	Material Covered
Week 1	Lab 1 : Light Microscope
Week 2	Lab 2: Animal cell : Animal cell structure
Week 3	Lab 3: Animal Cell: Animal Cell shape.
Week 4	Lab 4: Animal cell :Living Components and Non-living Components in animal cell
Week 5	Lab 5: Cell Division
Week 6	Lab 6: Animal Tissues :Epithelial tissue
Week 7	Lab 7: Animal Tissues :Connective tissue
Week 8	Lab 8: Animal Tissues :Muscle tissue
Week 9	Lab 9: Animal Tissues :Nervous tissue
Week 10	Lab 10: Classification :Scientific Name and Common Name
Week 11	Lab 11: Classification The Groups of Animal Kingdom (1)
Week 12	Lab 12: Classification The Groups of Animal Kingdom (2)
Week 13	Lab 13: Classification The Groups of Animal Kingdom (3)

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Huxley, T. H. (2022). On the study of zoology. DigiCat. Nicholson, H. A. (2022). A manual of zoology. BoD– Books on Demand.	Yes
Recommended Texts	Honegger, T. (2022). Zoology.	No
Websites	https://alison.com/tag/biology https://www.brianbrookshire.com/online-biology-curriculum/	

Grading Scheme

Semester One

مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Analytical Chemistry		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☒ Seminar
Module Code	Bio-1102		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	1	Semester of Delivery	
Administering Department	Department of Biology	College	Type College Code
Module Leader			e-mail
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	1/9/2025	Version Number	2

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	Organic Chemistry	Semester	2

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The primary objective of this course is to acquire basic concepts, principles, and techniques of modern analytical chemistry that would empower students with an analytical mind set and the abilities to solve diverse analytical problems in an efficient and quantitative way that conveys the importance of accuracy and precision of the analytical results. On successful completion of this course, students will be able: 1. to develop an understanding of the range and uses of analytical methods in chemistry. 2. to establish an appreciation of the role of chemistry in quantitative analysis 3. to develop an understanding of the broad role of the chemist in measurement and problem solving for analytical tasks. 4. to provide an understanding of chemical methods employed for elemental and compound analysis. 5. to provide experience in some scientific methods employed in analytical chemistry.

	6. to develop some understanding of the professional and safety responsibilities residing in working on chemical analysis.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	■ explain the fundamentals of analytical chemistry and steps of a characteristic analysis. ■ analyze titration curves for complex acid / base systems. ■ define titration curves for precipitation and complex formation titrimetry. ■ solve the electrochemical analyses problems. ■ calculate standard electrode potentials.
Indicative Contents المحتويات الإرشادية	this section introduces student to basic principles and practices in Analytical Chemistry. It covers functions and responsibilities of Analytical Chemists, analytical chemistry problems and their solutions in general. It also covers uses and application of the course in general. Learning unit 2 : Laboratory Practice and Safety (5 periods) This section introduces student to good laboratory practices, maintenance of laboratory safety and health standards. It also covers use of various laboratory apparatus and their calibration. A large portion of this unit is practical and students are expected to put in practice what they learn in class on their laboratory daily routine work. Learning unit 3: Titrimetric methods of analysis (14 periods) This section introduces student to basic nomenclature and titrimetric methods of analysis. The focus for this section is on acid-base reactions only. Students will also be introduced to various concentration units and how these units can be used in titrimetry. It will also induct students on hands on practical work as they apply theoretical knowledge in the laboratory sessions. Learning unit 4: Gravimetric methods of analysis (14 periods) This section introduces student to general principles of gravimetry. The focus for this section is on formation of different types of precipitates, processes involved in precipitation formation. It also covers post-treatment techniques of both inorganic and organic precipitates in order to obtain analytical data. It also covers application of gravimetric technique in chemical analysis. Learning unit 5: Sampling and sample preparation (8 periods) This section of the course introduces students the concept of sampling and various sampling techniques. It discusses various types of samples and how they are prepared for analysis. It covers various sample preparation methods and the nature of materials used for both organic and inorganic samples.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ 15 اسبوعا

Semester One

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Introduction to analytical chemistry
Week 2	Solutions and classification of solutions
Week 3	Express concentrations of solutions
Week 4	Density and specific gravity of solution
Week 5	The relationship between molarity or normality with percentage concentration
Week 6	Diluting solutions
Week 7	Solve of some Problems
Week 8	Concentration by percent
Week 9	P -functions
Week 10	Volumetric analysis
Week 11	Standard solution
Week 12	Acid –Base equilibrium
Week 13	Buffer solution
Week 14	Enthalpy
Week 15	Type of enthalpy
Week 16	Energy of bonds

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الأسبوعي للمختبر

	Material Covered
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Semester One

Week 1	Lab safety
Week 2	Laboratory equipment
Week 3	Laboratory techniques: distillation, filtration, centrifugation
Week 4	Vaporization, chromatography, decantation
Week 5	Pipets and pipet pumps,
Week 6	Volumetric analysis (titration)
Week 7	Methods expressing concentration of solutions and calculations of volumetric analysis
Week 8	Preparation of (0.1 N) NaOH solution and standardization with (0.1 N) HCL
Week 9	Preparation of (0.1 N) HCL solution and standardization with sodium carbonate
Week 10	Determination of carbonate and bicarbonate in mixture
Week 11	Determination acidity of Vinegar
Week 12	Determination of hardness of water
Week 13	Preparation and standardization of (0.1 N) AgNO ₃ solution
Week 14	Determination of chloride according to modified Volhard method
Week 15	Complex formation reactions

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Alam, M., Akhtar, M., & Asif, H. (2012). Textbook of Practical Analytical Chemistry-E-Book. Elsevier Health Sciences. Christian, G. D., Dasgupta, P. K., & Schug, K. A. (2013). Analytical chemistry. John Wiley & Sons.	Yes
Recommended Texts	Hussain, M. (2023). CHEM 221-001: Analytical Methods.	No
Websites	https://edu.rsc.org/teacher-pd/in-person/analytical-chemistry/classroom-resources	

Grading Scheme

مخطط الدرجات

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

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

Semester One

Module Information					
معلومات المادة الدراسية					
Module Title	General Mathematics		Module Delivery		
Module Type	Basic		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar		
Module Code	Bio-1103				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level		1	Semester of Delivery		1
Administering Department		Dept. of Biology	College	College of Science	
Module Leader	Dr. Anwar Nouruddin Imran		e-mail	anwarmath@uodiyala.edu.iq	
Module Leader’s Acad. Title		Assistant Professor	Module Leader’s Qualification		
Module Tutor	Name (if available)		e-mail	E-mail	
Peer Reviewer Name		Name	e-mail	E-mail	
Scientific Committee Approval Date		1/9/2025	Version Number		2

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	The aim of the General Mathematics course is to prepare students for tertiary study in a variety of areas where an ability to critically analyse information and work with data is inherent. Students with tertiary pathways into areas such as Health, Science, Psychology and Commerce would benefit from studying this course.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	After successfully completing this subject students should be able to: 1. Have knowledge of content and understanding of mathematical concepts and relationships. 2. Use mathematical algorithms and techniques (implemented electronically where appropriate) to find solutions to routine and complex questions. 3. Apply knowledge and skills to answer questions in applied and theoretical contexts. 4. Apply mathematical models to data in order to make predictions. 5. Develop solutions to mathematical problems set in applied and theoretical contexts. 6. Interpret mathematical results in the context of the problem. 7. Understand the reasonableness and possible limitations of the interpreted results, and recognise any assumptions made. 8. Develop and test conjectures. 9. Communicate mathematical ideas and reasoning to develop logical arguments. 10. Use appropriate mathematical notation, representations, and terminology.

Semester One

Indicative Contents المحتويات الإرشادية	1. Improving the student's ability to observe 2. To learn how to imitate and imitate: Imitation 3. To learn the method of experimentation

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Conducting fun scientific competitions (individual or team). Organizing lectures prepared by students. Formation of volunteer work groups. Scientific trips.

Student Workload (SWL) الحمل الدراسي للطلاب محسوب لـ 15 اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	60	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	65	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	4.3
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	125		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
1	laws of derivative
2	higher derivative and Implicit deferential
3	chain Rule
4	derivative of triangle function
5	derivative of hyperbolic function and derivative of invers
6	derivative of inverse hyperbolic function
7	derivative of logarithms and exponential

Semester One

8	laws of Integral
9	the integration of triangle function
10	the integration of invers triangle function
11	the integration of hyperbolic function
12	the integration of invers hyperbolic function
13	the integration of logarithms and exponential function
14	The methods of integration
15	tabular integration, Trigonometric integration, Trigonometric substitution

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1. "Discrete Mathematics and Its Applications" by Kenneth H. Rosen, 2007. 2. "Discrete Mathematics Demystified" by Steven G. Krantz, 2009. 3. "Fundamental Concepts of Modern Mathematics" by Max D. Larsen.	Yes
Recommended Texts	4. "Discrete Mathematics- Schaum's Outline" by S. Lipschutz and M. Lipson, 2007.	No
Websites	https://www.syriamath.net/library	

Grading Scheme

مخطط الدرجات

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

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

Module Information					
معلومات المادة الدراسية					
Module Title	Biophysics		Module Delivery		
Module Type	Basic		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar		
Module Code	Bio-1104				
ECTS Credits	6				
SWL (hr/sem)	167				
Module Level		1	Semester of Delivery		1
Administering Department		Type Dept. Code	College	Type College Code	
Module Leader	Amera Kanan		e-mail	amera@uodiyala.edu.iq	
Module Leader’s Acad. Title		Lecturer	Module Leader’s Qualification		M Sc.
Module Tutor	Name (if available)		e-mail	E-mail	
Peer Reviewer Name		Name	e-mail	E-mail	
Scientific Committee Approval Date		1/9/2025	Version Number		2

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	In this module we will review in detail several important modern physical science concepts, models, laws, tools and techniques that can be applied to addressing real biological questions, with a thorough discussion of the underlying physics. Physical science methods historically have been key to providing enormous breakthroughs in our understanding of fundamental biology - stemming from the early development of optical microscopy in understanding the cellular nature of life, through to complex structural biology techniques to elucidate the shape of vital biomolecules including proteins and DNA. In the first half of this module we will introduce the key biological macromolecules, the forces that are involved in maintaining their structure and how structure is determined. We will next discuss key physical science developments that have involved methods to study single cells in their native context, single- molecule biophysical methods that permit dynamic and mechanistic information to be extracted with unprecedented precision, and ground-breaking developments in areas of super-resolution imaging and biosensing. In the second half of the module we will discuss tools and techniques that, broadly, permit the detection and characterization of biological material using

Semester One

	non-visible electromagnetic radiation, and methods used to manipulate and quantify biological forces, with particular emphasis throughout placed on real applications. Examples of such tools discussed include electron microscopy, nuclear magnetic resonance spectroscopy and atomic force microscopy.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The module will focus on a number of concepts, models, laws, tools and techniques of physical science that underpin biophysical methods. It will address a broad range of challenging biological questions. During this module students will: 1. Comprehend the use of physical concepts and laws to produce models of biological systems, and quantitatively analyse these models. 2. Critically analyse the validity of assumptions made in these models and assess their impact on the validity of the results. 3. Understand the physical basis of experimental techniques used to study the biological systems introduced and explain the key results. 4. Assess the key features and biological significance of the systems introduced. 5. Demonstrate an understanding of the key physical principles behind several important biological processes underpinning living matter. 6. Apply modern biophysical tools and techniques to real applications
Indicative Contents المحتويات الإرشادية	The lecture course will discuss the scope of modern biophysics, and introduce students to the fundamentals of chemical bonding, and the structure and function of biological molecules including sugars, lipids, proteins, nucleic acids and molecular machines. Biophysical techniques including optical spectroscopy, dynamic light scattering, fluorescence spectroscopy and the basics of light microscopy will then be discussed in detail. Insights into single-molecule imaging and spectroscopy will then be provided, before a series of lectures on super-resolution approaches. Next, students will encounter techniques which use non-optical waves in their mode of operation, including electron microscopy, X-ray spectroscopy and nuclear magnetic resonance spectroscopy. Experimental techniques which rely on forces, including atomic force microscopy and optical tweezers will then be discussed in detail. Complementary and emerging experimental techniques will also be presented, as well as detailed analysis of molecular dynamics simulations. The lecture course will also include revision of the course material and guest research lectures from specialists in the field. Examples of guest research lectures include, but are not limited to: Digital Holographic Microscopy, Biofilms, Biophotonics and Raman Spectroscopy.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب لـ 15 اسبوعا

Structured SWL (h/sem)	77	Structured SWL (h/w)	5
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Semester One

الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	90	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	The lecture course will discuss the scope of modern biophysics, and introduce students to the fundamentals of chemical bonding
Week 2	The structure and function of biological molecules including sugars, lipids, proteins, nucleic acids and molecular machines.
Week 3	Biophysical techniques including optical spectroscopy, dynamic light scattering
Week 4	Fluorescence spectroscopy and the basics of light microscopy will then be discussed in detail.
Week 5	properties of fluids: pressure, buoyancy, Archimedes' rule, ideal fluid flow , Bernoulli equation, Venturi tube,
Week 6	Medical needles, Pitot tube
Week 7	real fluid viscosity and flow, Viscosity modulus, viscosity changes with degree Heat, Brazier's law,
Week 8	flow rate the blood and its relationship with pressure slope, velocity sedimentation
Week 9	fluid properties: fluid diffusion, Vic's Fluid Law, Maturity, Laws Maturity, boiling point of solutions
Week 10	fluid properties: surface tensile, Surface tensile modulus, some live applications
Week 11	Vibratory motion, force constant, motion Simple harmonic, potential energy and kinematics in simple harmonic motion
Week 12	fading or fading, resonance
Week 13	wave motion, sine wave equation, wave velocity in elastic media, sedentary pats, strikes,
Week 14	ear and hearing distress, hearing mechanism, Pitch and loudness, optics
Week 15	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الأسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Ohm's Law
Week 2	Lab 2: Balance of power
Week 3	Lab 3: Finding the ground acceleration using a simple pendulum
Week 4	Lab 4: Find the melting point of the wax from its cooling curve
Week 5	Lab 5: Determination of the specific heat of a poor conductor of heat (elastic)
Week 6	Lab 6: Find the density of a liquid
Week 7	Lab 7: Boyle's Law investigation
Week 8	Lab 8: Joule equivalent
Week 9	Lab 9: Finding the relationship between the current passing through the tungsten thread and the potential difference between its two ends
Week 10	Lab 10: Determination of the specific heat of graphite
Week 11	Lab 11: Study of the relationship between temperature and electromotive force of a
Week 12	Lab 12: Resistance changes with temperature
Week 13	Lab 13: Set the flame temperature
Week 14	Lab 14: Determination of the coefficient of thermal conductivity of a rubber tube
Week 15	Lab 15: The coefficient of volumetric expansion of liquids

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Leake MC: Biophysics: tools and techniques (CRC Press, 1st Ed, 2016) Leake MC: Single-Molecule Cellular Biophysics (CUP, 1st Ed, 2013)	No
Recommended Texts	Alberts A et al: Molecular Biology of the Cell (Garland Science, 6th Ed, 2014).	No
Websites	https://www.coursera.org/browse/physical-science/	

Grading Scheme

مخطط الدرجات

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

Semester One

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information

معلومات المادة الدراسية

Module Title	Human Rights and Democracy		Module Delivery	
Module Type	Basic		☒ Theory ☒ Lecture ☐ Lab ☐ L Tutorial ☐ Practical ☐ Seminar	
Module Code	UD04			
ECTS Credits	2			
SWL (hr/sem)	50			
Module Level			Semester of Delivery	
Administering Department		جميع اقسام الكلية	College	College of Engineering
Module Leader			e-mail	
Module Leader's Acad. Title		لجنة حقوق الانسان والديمقراطية	Module Leader's Qualification	
Module Tutor			e-mail	MSc.
Peer Reviewer Name			e-mail	
Scientific Committee Approval Date		1/9/2025	Version Number	2

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. يتعلم الطالب خلال السنة الدراسية أساسيات حقوق الانسان والديمقراطية ما حقوقه كيف يدافع عنها بالطرق القانونية وماهي ضماناتها الداخلية والدولية. 2. استحضار المعرفة في مجال الديمقراطية وأنواع أنظمتها واثرها على حقوق الانسان . 3. تنمية شخصية الطالب وتعزيز وعيهم في الأنظمة السياسية الديمقراطية وتفصيلها وكيفية تطبيقها على ارض الواقع واهمية ان يكون فعال في المجتمع من خلال احترامه لحقوق الآخرين ومعرفة ان الحقوق والحريات تنتهي عند بداية حقوقهم وحرياتهم ويؤدي واجباته بدلا من اكتساب الحقوق فقط. 4. تعزيز ثقافة السلام القائمة على العدل والمساواة.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. تمكين الطالب من معرفة اساسيات الدفاع عن حقوقه وحقوق الآخرين بعد معرفتها ومعرفة أهميتها له وللمجتمع بصورة عامة وأيضا معرفه كل شخص حدود حقوقه وحريته . 2. تمكين الطالب في المشاركة السياسية وذلك من خلال معرفته بأهمية مشاركته في الانتخابات وتأثير هذه المشاركة على سير الانتخابات وتشكيل السلطة فيما بعد. 3. معرفة الطالب ضمانات حقوقه وحرياته وماهي مصادرها . 4. معرفة الفرق بين الحقوق والحريات. 5. تمكين الطالب من معرفة ماهي المفهوم العلمي للديمقراطية وماهي جذورها وانواعها واشكالها . 6. يتعلم الطالب كيف يؤثر النظام الديمقراطي على حقوق الانسان وماهي العلاقة بينها. 7. ادراك الطالب ضرورة ان يكون مواطن فعال في المجتمع ايضاً معرفه شروط الناخب وشروط المرشح للانتخابات. 8. معرفة أنظمة الانتخابات وايهما افضل. 9. فهم الطالب للقانون الدولي لحقوق الانسان وايضاً معرفة مختصرة عن المنظمات الدولية والية عملها

Indicative Contents المحتويات الإرشادية	كالاتحاد المتحدة ومنظمة الصليب الأحمر وغيرها. الجزء الأول - تعريف حقوق الإنسان وحقوق الإنسان في الحضارات القديمة (تعريف الحق وتعريف الإنسان ومعرفة أهمية حقوق الإنسان بالنسبة للإنسان والمجتمع أيضا دراسة حقوق الإنسان في الحضارات كالحضارة المصرية والعراقية واليونانية والرومانية) ٤ (ساعات) الجزء الثاني معرف حقوق الإنسان في الأديان السماوية وأهمها الإسلام ٢ (ساعة) مصادر حقوق الإنسان تتضمن (مصادر دولية كالإعلان العالمي لحقوق الإنسان والعهدان الدوليان والمصادر الإقليمية التي تشمل الاتفاقيات الإقليمية كالاتفاقية الأوروبية والأمريكية والدستور ٢) (ساعة) ضمانات حقوق الإنسان (كالضمانات الدستورية والقانونية ٢) (ساعة) الاتفاقيات الدولية والإقليمية لحقوق الإنسان ٢ (ساعة) الحريات العامة وأنواعها والمقارنة فيما بينها ٢ (ساعة) مستقبل حقوق الإنسان والعولمة وحقوق الإنسان ٢ (ساعة) تعريف وتاريخ وأنواع الديمقراطية (دراسة تعريف ونشأة وتطور الديمقراطية مبادئها وأنواعها كالديمقراطية المباشرة وغير المباشرة والنظام الرئاسي والبرلماني) ٦ (ساعات) تعريف الانتخاب وشروطه وأنواع النظم الانتخابية وتعريف المجلس النيابي ٦ (ساعات) العلاقة بين الديمقراطية وحقوق الإنسان ٢ (ساعة)
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. زيادة وعي الطالب بأهمية معرفته حقوقه وواجباته اتجاه المجتمع وعلاقة حقوق الإنسان بالنظام الديمقراطي 2. ثقافة عامة في مجموعة من المجالات ومنها المجال القانوني والسياسي والاجتماعي ورفع ثقة الطالب بنفسه من خلال ربط المادة النظرية بالواقع العملي

Student Workload (SWL) الحمل الدراسي للطلاب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	1.1
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	50		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	15% (10)	5 and 10	LO #1, #2 #3, and #6 #7#8
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.				
	Report	1	15% (10)	13	LO #5, #8 and #9
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المناهج الأسبوعي النظري

	Material Covered
Week 1	محاضرة تعريفية عن المادة وأهميتها ..
Week 2	تعريف الحق والانسان وحقوق الانسان وأهمية حقوق الانسان , حقوق الانسان في الدين الإسلامي والحضارات القديمة.
Week 3	مصادر حقوق الانسان الدولية والإقليمية والمحلية.
Week 4	ضمانات حقوق الانسان الدستورية والقانونية وضمانات حقوق الانسان على الصعيد الدولي.
Week 5	ضمانات حقوق الانسان في الإسلام
Week 6	دور المنظمات الإقليمية في حماية حقوق الانسان.
Week 7	خصائص حقوق الانسان وتعريف الحريات العامة وأنواعه والمقارنة بينها وبين الحقوق القانون الدولي لحقوق الانسان والقانون الدولي الإنساني ومنظمة الصليب الأحمر.
Week 8	مستقبل حقوق الانسان وسبل تطويرها .
Week 9	العلامة وحقوق الانسان .
Week 10	تعريف الديمقراطية وتطورها التاريخي ومبادئها . الديمقراطية بين العالمية والخصوصية . أشكال الديمقراطية / الديمقراطية المباشرة.
Week 11	الديمقراطية شبه المباشرة والديمقراطية التمثيلية / اركان النظام التمثيلي / اشكال النظام التمثيلي.
Week 12	المجلس النيابي وأنواعه / الانتخاب وشروطه / هيئة الناخبين.
Week 13	تنظيم عملية الانتخاب / تحديد الدوائر الانتخابية / القوائم الانتخابية / المرشحات / الحملة الانتخابية / التصويت .
Week 14	نظم الانتخابات.
Week 15	علاقة الديمقراطية بحقوق الانسان وكيفية التأثير والتأثر فيما بينها.
Week 16	الامتحان النهائي

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	حقوق الانسان والطفل والديمقراطية / تأليف ماهر صالح علاوي ورياض عزيز هادي وعلي عبد الرزاق محمد واخرون / العاتك / بيروت / ٢٠٠٩	نعم
Recommended Texts	عباس الدليمي / حقوق الانسان الفكر والممارسة فخري رشيد ،صلاح ياسين /المنظمات الدولية / العاتك لصناعة الكتاب / بغداد عصام العطية / القانون الدولي العام / المكتبة القانونية /بغداد/2012	لا
Websites		

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Arabic Language		Module Delivery	
Module Type	Support		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UD02			
ECTS Credits	2			
SWL (hr/sem)	50			
Module Level	1	Semester of Delivery		2
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Othman Khlan Farhan		e-mail	othaman@uodiyala.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.	
Module Tutor	Name(if available)		e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date	1/9/2025		Version Number	2

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- تعريف الطلبة اهم المفاتيح الأساس في التعامل بلغة عربية فصیحة خالية من اي خطأ أو لحن وكيفية التعلم فيما يخص الأدب والنحو والبلاغة والاملاء العربية وكل هذا لغير الاختصاص. 2- رفع القدرات التعبيرية للطلّاب، وزيادة ثروتهم اللغوية ، ومساعدتهم على استخدام العبارة المناسبة بشكل دلالي واضح. 3- تدريب الطلبة على التحدث، والتنظيم المنطقي للأفكار، مع الحرص على التمسك باللغة العربية الفصحى . 4- رفع الأداء اللغوي العام لدى الطلبة. 5- تمكين الطلبة من الكتابة والتعبير والحديث بلغة عربية فصیحة وواضحة. 6- مساعدة الطلبة في التعبير عن افكارهم من خلال المناقشة والحوار بلغة سهلة وفصیحة . 7- جعل الطلبة قادرين على اكتساب خزين لغوي من الكلمات والفاظ والتعابير الفصیحة. 8- تعلم الطلبة الحفاظ على لغة القرآن التراث العربي الاصيل.
Module Learning Outcomes	الاهداف المعرفية والمهارية: 1- يعرف اساليب اللغة العربية. 2- يوظف ادوات الترفيم عند الكتابة . 3- يتدرب على كيفية تحليل النصوص الادبية . 4- يعرب بعض الامثلة والتمارين عن الجملة الاسمية والفعلية . 5- يناقش بعض النصوص القرآنية والادبية . 6- يبين الفرق بين علامات الاعراب الاصلية والفرعية. 7- يميز بين الافعال والاسماء في الجمل. 8- يتدرب على القراءة الواضحة والالقاء . 9- يتدرب على الكتابة بخط حسن من خلال التعريف بأنواع الخطوط العربية، وكتابة كل حرف، ثم مخرجات التعلم للمادة الدراسية

	كتاب الجمل والعبارات بخط الرقعة. 10- يميز بين حمزة القطع وهمزة الوصل عند الكتابة . 11- يميز بين حرفي الضاد والطاء في الكتابة والنطق. 12- يميز بين التاء المربوطة والمفتوحة أثناء الكتابة. 13- أحكام كتابة الضاد والطاء.
Indicative Contents المحتويات الإرشادية	توضيح أهمية اللغة العربية وفوائدها بالنسبة للطلاب الجامعي (2 ساعة). اللغة، تفسير وتحليل أول عشرة آيات من سورة الكهف مع بيان فضل السورة وسبب تسميتها وأهم الأوجه البلاغية والنحوية . (2 ساعة) اللغة، تفسير وتحليل ثلاثة آيات من سورة الحجرات مع بيان فضل السورة وسبب تسميتها وأهم الأوجه البلاغية والنحوية. (2 ساعة) الادب، تحليل ثلاثة عشر سطراً من قصيدة سفر أيوب في الشعر الحر للشاعر العراقي بدر شاكر السياب مع حياة الشاعر وأهم الأوجه البلاغية والنحوية في القصيدة. (2 ساعة) الادب، تحليل ثمانية أبيات في الحماس للشاعر أبي الطيب المتنبي مع حياة الشاعر مع أهم الأوجه البلاغية والنحوية في القصيدة. (2 ساعة) قواعد اللغة العربية وأهميتها معرفة أقسام الكلام (الاسم والفعل والحرف) وأهم علاماتها. قواعد اللغة العربية :- النكرة والمعرفة، أنواع المعارف (العلم) شرح موضوع (اسم العلم والاسم المركب) مع الأمثلة. (2 ساعة) قواعد اللغة العربية، (الضمائر) شرح موضوع (الضمائر الرفع والنصب والجر) مع الأمثلة. (2 ساعة) اللغة، حفظ وتفسير وتحليل سورة الأعلى مع بيان فضل السورة وسبب تسميتها وأهم الأوجه البلاغية والنحوية. الادب، تحليل ثمانية أبيات من قصيدة (كن بلسمًا) للشاعر (إيليا أبي ماضي) مع حياة الشاعر مع أهم الحالات الاعرابية والبلاغية. (2 ساعة). قواعد اللغة العربية، شرح موضوع (أسماء الإشارة) مع الأمثلة وحالات الاعراب، شرح موضوع (المعرف بالإضافة) مع الأمثلة وحالات الاعراب. (2 ساعة) قواعد اللغة العربية، شرح موضوع (الحال) معرفة الحال وصاحبها وما هي أنواع الحال مع الأمثلة وحالات الاعراب. (2 ساعة) الأملاء في اللغة العربية، علامات الترفيع وأهميتها في اللغة العربية. (2 ساعة) قواعد اللغة العربية، شرح موضوع (العدد) معرفة العدد وماهي أقسام العدد مع الأمثلة وحالات الاعراب.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	- المحاضرة والمشاركة . - المناقشة والحوار. - العصف الذهني. - كتابة التقارير عن الموضوع. - السؤال والجواب .
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	30	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	30	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	60		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	توضيح أهمية اللغة العربية وفوائدها بالنسبة للطلاب الجامعي.
Week 2	اللغة، تفسير وتحليل أول عشرة آيات من سورة الكهف مع بيان فضل السورة وسبب تسميتها وأهم الأوجه البلاغية والنحوية.
Week 3	اللغة، تفسير وتحليل ثلاثة آيات من سورة الحجرات مع بيان فضل السورة وسبب تسميتها وأهم الأوجه البلاغية والنحوية.
Week 4	الادب، تحليل ثلاثة عشر سطرًا من قصيدة سفر أيوب في الشعر الحر للشاعر العراقي بدر شاكر السياب مع حياة الشاعر وأهم الأوجه البلاغية والنحوية في القصيدة.
Week 5	الادب، تحليل ثمانية أبيات في الحماس للشاعر أبي الطيب المتنبي مع حياة الشاعر مع أهم الأوجه البلاغية والنحوية في القصيدة.
Week 6	قواعد اللغة العربية وأهميتها
Week 7	معرفة أقسام الكلام (الاسم والفعل والحرف) وأهم علاماتها.
Week 8	قواعد اللغة العربية :- النكرة والمعرفة، أنواع المعارف (العلم والاسم المركب) مع الأمثلة.
Week 9	قواعد اللغة العربية، (الضمائر) شرح موضوع (الضمائر الرفع والنصب والجر) مع الأمثلة.
Week 10	اللغة، تفسير وتحليل سورة الأعلى مع بيان فضل السورة وسبب تسميتها وأهم الأوجه البلاغية والنحوية.
Week 11	الادب، تحليل ثمانية أبيات من قصيدة (كن بلسما) للشاعر (إيليا أبي ماضي) مع حياة الشاعر مع أهم الحالات الاعرابية والبلاغية.
Week 12	قواعد اللغة العربية، شرح موضوع (أسماء الإشارة) مع الأمثلة وحالات الاعراب، شرح موضوع (المعرف بالإضافة) مع الأمثلة وحالات الاعراب.
Week 13	قواعد اللغة العربية، شرح موضوع (الحال) معرفة الحال وصاحبها وما هي أنواع الحال مع الأمثلة وحالات الاعراب.
Week 14	الأملاء في اللغة العربية، علامات الترقيم وأهميتها في اللغة العربية.
Week 15	قواعد اللغة العربية، شرح موضوع (العدد) معرفة تميز العدد وماهي أقسام العدد مع الأمثلة وحالات الاعراب.
Week 16	الأملاء في اللغة العربية، أحكام الهمزة (حمزة الوصل، حمزة القطع، كتابة الهمزة في وسط الكلمة).
Week 17	الأملاء في اللغة العربية: أحكام كتابة التاء المربوطة والمفتوحة والالف الممدودة والمقصورة.

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الأسبوعي للمختبر

	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources

مصادر التعلم والتدريس

Semester One

	Text	Available in the Library?
Required Texts	1. القرآن الكريم. 2. كتاب البلاغة والتطبيق. 3. كتاب الأملاء الواضح . 4. منهاج اللغة العربية لغير الاختصاص. 5. قواعد الإملاء الصحيحة لعبد السلام محمد هارون	Yes
Recommended Texts	1. كتاب شرح ابن عقيل على الفية ابن مالك/ ابن عقيل عبد الله بن عبد الرحمن. 2. كتاب الميسر في اللغة العربية لغير الاختصاص/ الدكتور زياد طارق شولي 3. منهاج اللغة العربية العامة لغير الاختصاص/ عبد القادر حسن امين 4. معاني النحو للدكتور فاضل السامرائي 5. إعراب القرآن وتفسيره وبيانه لمحمود الدرويش	Yes
Websites	1- http://www.al-mostafa.com/index.htm 2- http://www.almeshkat.net/books/index.php 3- http://www.imamu.edu.sa/arabiyah	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Semester Two

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	General Botany		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	Bio-1201			
ECTS Credits	7			
SWL (hr/sem)	174			
Module Level	1	Semester of Delivery		2
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Khalid Dheyaa Abdulwahid		e-mail	chechanikd75@uodiyala.edu.iq
Module Leader's Acad. Title	Assis. Prof.		Module Leader's Qualification	Ph.D.
Module Tutor	Khalid Dheyaa Abdulwahid		e-mail	chechanikd75@uodiyala.edu.iq
Peer Reviewer Name	Khalid Dheyaa Abdulwahid		e-mail	chechanikd75@uodiyala.edu.iq
Scientific Committee Approval Date	1/9/2025		Version Number	2

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	Semester	
Co-requisites module	Bio-2312	Semester	3

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	5. Learn about plants in nature and how they are classified and developed. 6. Identify the plant cell and its various components. 7. Identify plant tissues and their functions. 8. Identify the different parts of the plant. 9. Studying photosynthesis in plants. 10. Granting the student a bachelor's degree in the theoretical and practical aspects.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	7. Identify the science of Botany and learn about origin, development, and systematics, classification of plants as well as In addition to the location of the plant kingdom within the pyramid of life. 8. Learn about the differences photosynthetic organisms (plants1) and Vegetabilia kingdom (plants2), as well as fully parasitic plants. 9. Clarification the Cell theory and learn about Light, TEM, SEM microscopy and identification of the parts and organelles of plant cell. 10. Distinguish between eukaryotic and prokaryotic plants and identify the parts of the nucleus in a plant cell. As well as discussing the plant life cycle and the mechanisms of cell division in plant cells. 11. Distinguishing the important differences between mitochondria and

	plastids, in addition to knowing a brief about their development from an evolutionary point of view. 12. A detailed explanation of plant tissues, their types, locations in the plant and their functions. 13. Identify the organs of plant and studied anatomically. 14. Explain the process of photosynthesis in plants.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. A. Cognitive goals A1-The first level // Knowledge development // Develop the student's ability to recall what he learned about scientific facts related to Botany and enable students to obtain knowledge and understanding of the intellectual and applied framework in the science of Botany. A2-The second level // Improving comprehension level // Developing the ability to interpret, predict and deduce and enable students to obtain knowledge and understanding of the requirements in plant groups according to scientific standards. A3-The third level // Developing applied abilities (Application) // Informing students of modern techniques in Botany through showing films and scientific research. A4-The fourth level // provide the student with the ability to analyze (analysis) // enable students to gain knowledge in Botany. B. objectives and skills B1- Providing students with the additional basics related to the outputs of thinking and analysis. B2- Learn experimentation. B3- Improving the student's ability in observation. B4- Learn how to imitate and simulate. C. Emotional and value goals C1- Asking general questions during laboratory and theoretical lessons. C2- Assign students to report on various topics of Botany. C3- Enable students to conduct all experiments related to Botany. C4- Discussing and directing graduation research for fourth-year students.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ 15 اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem)	96	Unstructured SWL (h/w)	6.4

الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction of Botany - Origin and development- Systematics and classification
Week 2	The nature of plant - Photosynthetic organisms –Vegetabilia kingdom -Fully parasitic plants
Week 3	The plant cell : Introduction to Cells-Cell theory- Types of microscopy - Cell membrane and
Week 4	The plant cell: Nucleus- Nucleolus-Chromosomes.
Week 5	The plant cell: Ribosomes- Protein Synthesis -Rough endoplasmic reticulum- Golgi
Week 6	The plant cell: Life Cycle -karyokinesis, cytokinesis- Meiosis, Mitosis, Mitochondria and
Week 7	The plant cell: Vacuoles and other Vesicles - Cellular Skeleton
Week 8	Mid exam
Week 9	Tissues of plant: Epidermis- Ground tissues- Supportive tissues- Meristems
Week 10	Tissues of plant: Vascular tissues- Periderm
Week 11	Organs of plant: Roots - Roots forms- Modification of roots -Anatomy of root
Week 12	Organs of plant: Stems- Modification of stems - Anatomy of stem
Week 13	Organs of plant: Leaves - Leaves form - Anatomy of leaves, Flowering plants
Week 14	Photosynthesis
Week 15	Final exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab1 The Plant cell (Living & non-Living contents)

Week 2	Lab2 The Cell wall
Week 3	Lab3 The cell division (Mitosis & Meiosis)
Week 4	Lab4 The Epidermis in Dicot & Monocot
Week 5	Lab5 The plant tissues: Parenchyma tissue
Week 6	Lab6 The plant tissues: Collenchyma tissue
Week 7	Lab7 The plant tissues: Sclerenchyma tissue
Week 8	Mid exam
Week 9	Lab8 The plant tissues: Xylem & Phloem
Week 10	Lab9 Organs of plant: The Root
Week 11	Lab10 Organs of plant: The Stem
Week 12	Lab11 Organs of plant: The Leaf
Week 13	Lab12 Organs of plant: The Flower
Week 14	Lab13 Organs of plant: The Fruit
Week 15	Final exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Introduction to Botany, Alexey Shipunov Shipunov, Alexey. Introduction to Botany. Lecture notes. February 8, 2018 version	Yes
Recommended Texts	BOTANY ,TAMIL NADU TEXTBOOK CORPORATION COLLEGE ROAD, CHENNAI - 600 006.Government of Tamil Nadu First edition – 2005.	Yes
Websites	http://ashipunov.info/shipunov/school/biol_154	

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Organic Chemistry		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	Bio-1212			
ECTS Credits	7			
SWL (hr/sem)	175			
Module Level	1	Semester of Delivery		2
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Waseem Yousif Mohammed		e-mail	WaseemYousif@uodiyala.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.	
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date	1/9/2025		Version Number	2

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Analytical Chemistry	Semester	1
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The students will acquire a broad understanding of the knowledge base in Organic Chemistry and its terminology or discourse. They will operate in a range of varied but predictable contexts that require the use of a specified range of techniques and information sources. The student will be required to identify principles and concepts underlying theoretical frameworks. The student will take responsibility for the nature and quality of outputs through defined problem classes.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	At the end of this module students should be able to: • Introduction to organic chemistry, bonding, hybridization, resonance and delocalization. • Functionality, nomenclature, structure of functional groups affecting their reactivity. • Conformation of straight chain alkanes, structural isomers. • Configuration, chirality, enantiomers/diastereomers, Cahn-Ingold-Prelog priority rules (R/S) and Fischer/Newman projections. • Hydrocarbon rings, strain energy and effect of substitution, chair and boat cyclohexane, conjugation and role of cyclization in benzene aromaticity.

Indicative Contents المحتويات الإرشادية	The module will include: 1. General concepts in organic chemistry for predicting atom and electronic structure of molecules, stability, reactivity and molecular properties (bond strength, pH etc.) 2. General concepts and mechanisms underlying organic reactions and ability to draw the mechanism for a given reaction or to give reagents required for an organic reaction. Throughout the course examples will be provided to link the underlying concepts and reactions with biological (e.g. metabolism) and pharmaceutical design (e.g. drugs).
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Lessons of all units will be offered in an interactive lecture where student participation is mandatory either by forming small group discussion in class, exchange ideas and question one another. Where applicable students will be assigned problems to solve and encouraged to assess one another. Learning material will be supplied to students in class or uploaded on Blackboard learning management system. Students will also be regularly referred to relevant section of the prescribed text book. Most of the tutorial work will be done as self-study or with the assistance of a tutor. The teacher will facilitate lectures and laboratory experiment sessions with the assistance of a tutor or laboratory demonstrator. Assessment will be both formative and summative. Formative assessment refers to assessment whose purpose is to monitor student learning but will not be graded. Summative assessment refers to assessment given to students for grading such as theory tests, practical tests and examination.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	96	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

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

assessment	Exam				
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Hydrocarbons
Week 2	IUPAC name of alkanes
Week 3-4	Coupling of alkyl halides with organometallic compound
Week 5-6	Preparation of alkenes
Week 7	Addition of halogen bromide. Peroxide effect
Week 8	Oxidation of tributylborane gives butanol .
Week 9	Free – radical polymerization of alkene
Week 10-	Mid exam
Week 12	AROMATIC COMPOUND
Week 13	Representation of benzene ring
Week 14	Polysubstituted Benzenes
Week 15	Determination of orientation:-

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الأسبوعي للمختبر

	Material Covered
Week 1	Lab1 Boiling point Definition
Week 2	Lab2 Experimental Procedures Boiling Point
Week 3	Lab3 Distillation
Week 4	Lab4 Types of Distillation:
Week 5	Lab5 PROCEDURE Distillation
Week 6	Lab6 Extraction
Week 7	Lab7 Procedure Extraction
Week 8	Mid exam
Week 9	Lab8 Definition Melting Point
Week 10	Lab9 Procedure: Melting Point
Week 11	Lab10 Recrystallization: Purification of Crystalline Organic Compounds
Week 12	Lab11 Procedure: Recrystallization
Week 13	Lab12 Sublimation
Week 14	Lab13 Procedure Sublimation
Week 15	Final exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the
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		Library?
Required Texts	The foundations of analytical chemistry, part one and two, by Dr. Moayad Al-Abaiji	Yes
Recommended Texts	1. Basset, J.et.al, Trans. By A Hadyana Pudjaatmaka dan L. Setiono, 1994, 2. Vogel, Quantitative Inorganic Analysis, 4th Ed., Jakarta: Penerbit Buku Kedokteran E G C. Svehla, G. & Vogel, A.L., Trans. By Setiono, 1985, 3. A Quantitative Inorganic Analysis, 3rd Ed., New York: John Wiley & Sons Inc. Skoog, D.A. & West, D.M., 1990 4. Analytical Chemistry, 5th Ed., Philadelphia: Saunders Golden Sunburst Series	YES
Websites	www.chemicalprocessing.com	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Biostatistics		Module Delivery	
Module Type	Basic		☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	Bio-1213			
ECTS Credits	5			
SWL (hr/sem)	130			
Module Level	UGx11 1	Semester of Delivery		2
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Dr. Anwar Nouruddin Imran		e-mail	anwarmath@uodiyala.edu.iq
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date	1/9/2025		Version Number	2

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	General Mathematics	Semester	1
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	- To discuss and critic reports and articles applying biostatistics to epidemiology - To conduct preliminary/simple statistical analysis and to plan more sophisticated future statistical analyses - To work with scientific experts including biostatisticians, epidemiologists and public health professionals
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	- Extract the most useful/important information from scientific articles - Interpret graphical summaries and statistical tables - Criticize the statistics of simple epidemiological studies - Describe the study population using the appropriate indicators - Formulate statistical hypothesis according to the objective aimed by the study - Apply the statistical test using the R or STATA software and to interpret the results - Measure the strength of the association between two quantitative or qualitative variables and interpret it - Summarize statistical results and to write the material, methods and result sections of a report/article.

Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Introduction and Some Basic Concept, Statistical, Population, Sample, Random Sampling View Data, Frequency Distribution Table Measures of Central Tendency, Median, Mode Scale of variance, rang, variance, Standard deviation, Standard error, coefficient of variance Random Variable, discrete random variable, continuous random variable Distribution, Binomial Distribution, Normal Distribution Mathematical expectation concept Significance difference test Regression, correlation coefficient Exercises and discussion Type of distribution, discrete distribution, continuous distribution What is the distribution theory Preparatory week before the final Exam
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ 15 اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المناهج الأسبوعي النظري

	Material Covered
Week 1	Concepts Fundamental
Week 2	Presentation of Data
Week 3	Measures of Central Tendency
Week 4	Measures of Dispersion
Week 5	The distributions, the binomial distribution, normal distribution
Week 6	Statistical tests: T test, Z test, X test, F test
Week 7	Analysis of variance, experiment, unit experimental, treatment, refined, degrees of freedom, total squares, mean Squares
Week 8	Regression, correlation coefficient
Week 9	SPSS statistical program introduction and definition
Week 10	Introducing SPSS tools
Week 11	Application analysis examples of laboratory experiments using the SPSS program
Week 12	Methods of expressing the statistical results of biological experiments Variance
Week 13	Analysis of Variance
Week 14	Some Special Probability distributions
Week 15	Final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Hogg, R. V., McKean, J. W., & Craig, A. T. (2019). Introduction to mathematical statistics. Pearson.	Yes
Recommended Texts	Antonisamy, B., Premkumar, P. S., & Christopher, S. (2017). Principles and Practice of Biostatistics-E-book. Elsevier Health Sciences.	Yes
Websites	https://www.sciencedirect.com/topics/medicine-and-dentistry/biostatistics	

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Safety and Biosecurity		Module Delivery	
Module Type	Supporter		☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	Bio-1204			
ECTS Credits	3			
SWL (hr/sem)	75			
Module Level	1	Semester of Delivery		2
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Ibtihal Hameed Mohsin		e-mail	ibtihalhameed@uodiyala.edu.iq
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.
Module Tutor			e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date	1/9/2025		Version Number	2

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	The basic objective of a biosafety program is the containment of potentially harmful biological agents. The purpose of containment is to reduce or eliminate exposure of laboratory workers, other persons, and the outside environment to potentially hazardous agents: - Identify relevant biosafety regulations and documentation - Apply biosafety and biosecurity concepts in the laboratory setting - Organize laboratory space according to its biosafety level - Select appropriate equipment for the biosafety level of their laboratory - Manage biosafety-related risks in their laboratory
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Biosafety and biosecurity address the safe handling and containment of infectious microorganisms and hazardous biological materials in the laboratory setting. Whereas biosafety aims at protecting public health and the environment from accidental exposure to biological agents, biosecurity deals with the prevention of misuse through loss, theft, diversion, or intentional release of pathogens, toxins, and any other biological materials.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. A. Cognitive goals A1-The first level // Knowledge development // Develop the student's ability to

	recall what he learned about biosafety and enable students to obtain knowledge and understanding of the intellectual and applied framework in the biosafety and biosecurity. A2-The second level // Improving comprehension level // Developing the ability to interpret, predict and deduce and enable students to obtain knowledge and understanding of the requirements in biological risks in lab. A3-The third level // Developing applied abilities (Application) // Informing students of modern protocols in Biohazardous Waste and risk assessment. A4-The fourth level // provide the student with the ability to analyze (analysis) // enable students to gain knowledge in safety. <u>B. objectives and skills</u> B1- Providing students with the additional basics related to the outputs of thinking and analysis. B2- Learn experimentation. B3- Improving the student's ability in observation. B4- Learn how to imitate and simulate. <u>C. Emotional and value goals</u> C1- Asking general questions during the theoretical lessons. C2- Assign students to report on various topics of biosafety. C3- Enable students to apply the protocols of biosecurity in lab.
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	27	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuou s	All

	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Biohazard Definition
Week 2	Rules, Regulations & Guidelines
Week 3	Risk Assessment
Week 4	Biological Safety and Biosafety Levels
Week 5	The Biosafety Level 1 Laboratory
Week 6	The Biosafety Level 2 Laboratory
Week 7	Biological Safety Level 3 Laboratories
Week 8	Mid Exam
Week 9	Laboratory Biosecurity
Week 10	Safety Equipment
Week 11	Decontamination and waste management
Week 12	Biohazardous Waste
Week 13	Biohazard Spill Clean-Up Procedures
Week 14	Use of Animals, Human Subjects and Materials in Research
Week 15	Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Salerno, R. M., & Gaudioso, J. (Eds.). (2015). <i>Laboratory biorisk management: biosafety and biosecurity</i> . CRC Press.	Yes
Recommended Texts	Burnette, R. (2013). <i>Biosecurity: understanding, assessing, and preventing the threat</i> . John Wiley & Sons. Karus, A., Praakle, K., Saar, T., Must, K., Randoja, H., & Viltrop, A. (2018). Biosafety and biosecurity manual. Zhou, D., Song, H., Wang, J., Li, Z., Xu, S., Ji, X., ... & Xu, J. (2019). Biosafety and biosecurity. <i>Journal of biosafety and biosecurity</i> , 1(1), 15-18.	No
Websites	https://www.cdc.gov/safelabs/resources-tools/biosafety-resources-and-tools.html	

Grading Scheme مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Computer Skills		Module Delivery
Module Type	Basic		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	UD03		
ECTS Credits	4		
SWL(hr/sem)	100		
Module Level	1	Semester of Delivery	
Administering Department	Science and Engineering	College	College of Engineering College of Science
Module Leader		e-mail	
Module Leader's Acad. Title		Module Leader's Qualification	
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	1/9/2025	Version Number	2

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	
Module Objectives أهداف المادة الدراسية	1. Training students on the basics of using the computer and providing them with the necessary skills to deal with the computer with high efficiency. 2. Assisting the student in distinguishing and developing his\ her scientific and artistic abilities. 3. Enriching the student's skills to be able to deal with the computer with high efficiency. 4. Providing students with away to use other modern technologies related to the educational process.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Enabling the student to know the concepts of information technology by learning the basics of the computer. 2. Enabling the student to know about the use of GUI operating systems. 3. Enabling the student to deal with the skills of using the operating system (Windows operating system) through exploring, customizing, and controlling its settings. 4. Enabling the student to work on the word processing program (Microsoft Word). 5. Enabling the student to work on the spreadsheet program (Microsoft Excel). 6. Enabling the student to work on the presentation program (Microsoft PowerPoint).
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. • Course introduction(4hrs) • Working with GUI operating systems with a focus on Microsoft Windows OS • Microsoft Office Word(MSWord) • Microsoft Office Excel(MS Excel) • Microsoft Office PowerPoint(MS PowerPoint)
Description	Overview of computers: basic components, applications. GUI operating systems: Microsoft Windows operating system. Microsoft Office Word: getting started with Word, editing a document and formatting text and paragraphs, adding tables and inserting graphic objects, controlling page appearance and proofing a document. Microsoft Office Excel: getting started with Excel, sorting, selecting and subtotaling data, formulas and functions, worksheet formatting and presentation. Microsoft Office PowerPoint: getting started with PowerPoint, developing a PowerPoint presentation, adding graphical elements to your presentation and modifying objects in your presentation, adding graphical elements, tables and charts to your presentation and modifying objects in your presentation, prepare to deliver your presentation.

Learning and Teaching Strategies

استراتيجيات التعلم و التعليم

Strategies	In this course, students are guided by: • Using different examples. • Using different styles of discussion that aim to connect the theoretical and practical sides. • Asking questions and giving exercises that require analysis and conclusions related to lectures. • Encourage students to participate in discussions and do the practical work. • Encourage students to work in groups.
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Student Workload(SWL)

الحمل الدراسي للطلاب محسوبة لـ 15 اسبوع

Structured SWL(h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	64	Structured SWL(h/w) الحمل الدراسي المنتظم للطلاب اسبوعيا	4
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Unstructured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	36	Unstructured SWL(h/w) الحمل الدراسي المنتظم للطالب خلال الفصل أسبوعياً	2.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight(Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10%(10)	6 and 12	
	Assignments	2	10%(10)	2 and 13	
	Projects/ Lab.	1	10%(10)	Continuous	All
	Report	1	10%(10)	13	
Summative assessment	Midterm Exam	2hr	10%(10)	9	
	Final Exam	3hr	50%(50)	16	All
Total assessment			100%(100Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week1	Overview of computers and their basic components and applications
Week2	Introduction to windows operations system
Week3	Operation System properties, Difference between OS,program ,software , application
Week4	Network and internet (setting ,www, Email, search Engine)
Week5	Microsoft Office Word: Editing a Document and Formatting Text and Paragraphs
Week6	Microsoft Office Word: Adding Tables and Inserting Graphic Objects
Week7	Microsoft Office Word: Controlling Page Appearance and Proofing a Document
Week8	Microsoft Office Excel: Getting Started with Excel
Week9	Microsoft Office Excel: Sorting, Selecting and Sub totaling data
Week 10	Microsoft Office Excel: Formulas and Functions
Week 11	Microsoft Office Excel: Worksheet Formatting and Presentation
Week 12	Microsoft Office Power Point: Getting Started with Power Point
Week 13	Microsoft Office Power Point: Developing a PowerPoint Presentation, Adding Graphical Elements to Your Presentation and Modifying Objects in Your Presentation
Week 14	Microsoft Office Power Point: Adding Graphical Elements, tables and charts to Your Presentation and Modifying Objects in Your Presentation
Week 15	Microsoft Office Power Point: Prepare to deliver your presentation

Week 16	Preparatory week before the final exam
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Delivery Plan (Weekly-Lab Syllabus) المنهاج الأسبوعي للمختبر	
	Material Covered
Week1	Overview of computers and their basic components and applications
Week2	Introduction to windows operations system
Week3	Operation System properties, Difference between OS,program ,software , application
Week4	Network and internet (setting ,www, Email, search Engine)
Week5	Microsoft Office Word: Editing a Document and Formatting Text and Paragraphs
Week6	Microsoft Office Word: Adding Tables and Inserting Graphic Objects
Week7	Microsoft Office Word: Controlling Page Appearance and Proofing a Document
Week8	Microsoft Office Excel: Getting Started with Excel
Week9	Microsoft Office Excel: Sorting, Selecting and Sub totaling data
Week 10	Microsoft Office Excel: Formulas and Functions
Week 11	Microsoft Office Excel: Worksheet Formatting and Presentation
Week 12	Microsoft Office Power Point: Getting Started with Power Point
Week 13	Microsoft Office Power Point: Developing a PowerPoint Presentation, Adding Graphical Elements to Your Presentation and Modifying Objects in Your Presentation
Week 14	Microsoft Office Power Point: Adding Graphical Elements, tables and charts to Your Presentation and Modifying Objects in Your Presentation
Week 15	Microsoft Office Power Point: Prepare to deliver your presentation
Week 16	Preparatory week before the final exam

Learning and Teaching Resources مصادر التعلم التدريسي		
	Text	Available in the Library?
Required Texts	- JoanLambertandSteveLambert,Windows10stepbystep, 1st Edition 2015. - JoanLambertandCurtisFrye,MicrosoftOffice2016stepbystep,1stEdition2015.	Yes
Recommended Texts	- Michael Miller, ABSOLUTE BEGINNER'S GUIDE TO COMPUTERBASICS,5thEDITION,QUEIndianapolis,Indiana 46240, 2010. - PaulMcFedries,TEACHYOURSELFVISUALLY MICROSOFT WINDOWS 10, ANNIVERSARY	No
Websites	https://support.microsoft.com/en-us/products https://www.goskills.com/Microsoft-Office	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	New Headway Plus/ Beginner		Module Delivery
Module Type	Basic		☒ Theory ☒ Lecture ☐ Lab ☐ L Tutorial ☐ Practical ☐ Seminar
Module Code	UD01		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	UGI	Semester (s) offered	
Administering Department	All Departments	College	College of Engineering
Module Leader		e-mail	
Module Leader's Acad. Title		Module Leader's Qualification	MSc.
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	1/9/2025	Version Number	2

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

Module Aims, Learning Outcomes, Indicative Contents and Brief Description	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية مع وصف مختصر	
Module Aims أهداف المادة الدراسية	The module aims to develop the students' English skills in reading, writing, listening and speaking.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Read and understand simple texts in English. 2. Answer simple comprehension questions and match sentences about texts. 3. Reconstruct texts by reordering sentences. 4. Understand the main idea of a text. 5. Identify specific information in a text. 6. Writing and paraphrasing paragraphs.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. i) Grammar has a core place in language teaching and learning. ii) A wide variety of practice tasks in all the four skills are essential to language learning. iii) Everyday expressions, particularly of spoken English, also need a place in the syllabus. These can be functional, social, situational or idiomatic.
Course Description	Each unit is organized to enhance students' basic knowledge of vocabulary and grammar through reading texts. The students will learn how to form simple sentences and use them in real life situations as well as in writing different assignments. By the end of the course, students will be able to produce basic sentences and communicate in simple real-life situations.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Headway's trusted methodology combines solid grammar and practice, vocabulary development, and integrated skills with communicative role-plays and personalization. Authentic material from a variety of sources enables students to see new language in context, and a range of comprehension tasks, language and vocabulary exercises, and extension activities practice the four skills. 'Everyday English' and 'Spoken grammar' sections practice real-world speaking skills, and a writing section for each unit at the back of the book provides models for students to analyze and imitate.
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Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل In class lectures 26 In class tests 5 Seminars 2	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل Library, dorm, home memorizing 5 Preparation for tests 8 Homework 4	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	1.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation

تقييم المادة الدراسية

		Time (hr)	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	5% (5)	5, 10, 12, 15	All
	Assignments	6	20% (20)	2, 4, 6, 8, 10, 12	LO # 1, 3, 4, 5 and 6
	Seminars	2	5% (5)	Continuous	LO # 1-5
Summative assessment	Midterm Exam	2	20% (10)	7	LO # 1-3
	Final Exam	3	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المناهج الأسبوعي النظري

	Material Covered
Week 1	GRAMMAR, READING, MAIN COURSE SPEAKING, LISTENING, VOCABULARY am/is/are my/your This is... Introduction dialogues, Everyday English dialogues Introductions, Good morning! Practicing introduction dialogues. People meet each other and introduce someone else. How are you? What's this in English? Numbers 1-10 and plurals.
Week 2	He/she/they His/her. Questions Where are they from? Two people are on holiday in New York. Students ask and answer questions about where people are from. Countries, Numbers 10-20, 11-30. A set of cities and countries: Brazil, Spain... Adjectives: awful, really good, fantastic, beautiful Nouns: centre, hospital, building, park

Week 3	Verb to be is recycled and extended to include negative and question forms. We're in Las Vegas! Roleplay: in a band. An interview with the band Metro 5. Jobs: a nurse, a doctor. Personal information: surname, first name, address, married ... Social expressions: I'm sorry, thanks, please...
Week 4	Possessive adjectives. Possessive 's. Has/ have Adjective + noun Irregular Plurals Paddy McNab and his family, My best friend. The alphabet, On the phone, Saying email addresses. Who are they? Listen and identify the people. The family: mother, son. Describing a friend: very beautiful, really funny...
Week 5	Present Simple: I/you/we/they a/an Adjective + noun Colin Brodie from Dundee. Role play: At a party. Where is Colin? Who is he with? At a party: Flavia and Terry are at a party in London. The lexical set of sports/food/drinks. Languages and nationalities.
Week 6	Present Simple: He/she Question and negatives Adverbs of frequency Prepositions of time Lois Maddox Talking about daily routines, Asking and answering questions about daily routines, Lifestyle questionnaire Listening a phone conversation between Lois and Elliot. Days of the week. The time. Words that go together: watch TV, get up early...
Week 7	Question words Subject Pronouns Object Pronouns Possessive Pronouns This and that A postcard from San Francisco, A holiday postcard. Describing lifestyles, preferences and places, Roleplay: conversations in town. Listening the requests with Can I ? Adjectives: lovely, terrible, comfortable, friendly... Opposite adjectives: new/old, big/small Places: chemist, post office
Week 8	There is /are Prepositions: in, on, under, next to Vancouver-the best city in the world, What to do and where to go. Talking and asking about rooms and furniture, Giving directions. My home town, Steve talks about living in Vancouver. Rooms and furniture: living room, bedroom ... In and out of town: beach, mountain, sailing...
Week 9	Was/were born Past simple: irregular verbs It's a Jackson Pollock. Telling a story from pictures, Saying the dates in English. Magalie Dromand, Magalie dromand talks about her family. Saying years People and jobs Irregular verbs Have, do, go: have lunch, do homework, go shopping
Week 10	Past simple: regular and irregular Questions Negatives Ago Dialogues with simple past. Did you have a good weekend? Asking about holidays, A questionnaire, My last holiday, Roleplay: asking and giving directions. Angie and Rick are at work, Jack and Millie's holiday. Weekend activities: go to the cinema, have a meal... Time expressions: on Monday, last night... Sports and leisure: tennis, skiing, windsurfing... Play or go: play tennis, go skiing... Seasons: winter, summer...
Week 11	Can / can't, Adverbs, Adjective + noun Requests and offers The Internet, what can you do on the internet? Talking about what you can do, talking about everyday problems, Five people talk about what they do on the internet. Verbs: draw, run, drive... Verb noun: Listen to the radio, chat to friends Adjective noun: fast car, busy city, dangerous sport Opposite adjectives: dangerous/ safe, old/modern, old/young.
Week 12	I'd like, You are what you eat, Discussion-what is a good diet? Conversation with Adam, Shopping: bread, milk, fruit, Please and thank you Some /any, Like and would like People from different parts of the world describe what they eat. Roleplay: Ordering a meal. Birthday wishes, what people want on their birthday. stamps, cheese, ham... Food: cereal, salad, pasta, fish... In a restaurant: menu, starter, desert, soup, salmon
Week 13	Present continuous, Present simple and present continuous. This week is different, Colin, a millionaire, gives money to homeless teenagers What's the matter? Why don't you? What is Nigel wearing? Nigel is on holiday, What's the matter. Colors: blue, red, green... Clothes: jacket, trousers, shoes and socks... Opposite verbs: buy/sell, love/hate, open/close...
Week 14	Future plans, Revision: question words, tenses. Seven countries in seven days, Life's big events: three people talk about their family, education, work and ambitions. A mini

	autobiography. Eddie is talking to a friend about his holiday plans, social expressions Transport: travel by bus, coach, motorbike, plane... Revision
Week 15	Irregular verbs, phonetic symbols, consonants and vowels.

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	New Headway Beginner, by lizand john soars	Yes
Websites	https://www.learnenglish.de/ https://www.englishgrammar.org/ https://www.phrasebank.manchester.ac.uk/	

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

Note:

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

Academic Program Description Form

University Name: University of Diyala
Faculty/Institute: College of Science
Scientific Department: Biology
Academic or Professional Program Name: BSc.
Assis. Prof Dr. Esam Hamid Hameed
Final Certificate Name: BSc. in Biology
Academic System: Bologna Process
Description Preparation Date: 5/9/2025
File Completion Date: 5/9/2025

Signature:

Head of Department Name:

Assis. Prof. Esam Hamid Hameed

Date: 10/9/2025

Signature:

Scientific Associate Name:

Prof. Dr. Munther Hamza Rathi

Date: 10/9/2025

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance

Ghassan Sabeeh Mahmood

Approval of the Dean
Prof. Dr. Taha Mohammed Hasan

University of Diyala
جامعة ديالى



First Cycle – Bachelor's Degree (B.Sc.) – Biology
بكالوريوس - علوم حياة



2025/2026

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1. Mission & Vision Statement

Vision Statement

Opportunities for high-level training are available for the students enrolled in the Department of Biology, to prepare them to enter the labor market after graduation to work in the medical laboratories, teaching in the secondary schools, and working in the agricultural enterprises, environmental affairs, water resources and other institutions that have relationships with biological sciences in one way or another. The combination of instructional methods leads students to a balanced understanding of the scientific methods used by biologists to make observations, develop insights and create theories about the living organisms that populate our planet. Small class sizes within the biology program foster a close working relationship between academic staff and students in an informal and nurturing atmosphere.

Mission Statement

The biology academic staff pursues a multifaceted charge at Diyala University. The Program seeks to provide all biology students with fundamental knowledge of biology, as well as a deeper understanding of a selected focus area within the biological sciences. The curriculum and advising have been designed to prepare graduates for their professional future, whether they choose to work as field biologists specializing in botany or wildlife, or to pursue advanced degrees in the life sciences or health sciences. The biology program also provides the necessary fundamental knowledge of the life sciences to support the Nursing degree, the Environmental Studies degree, and the Associate of Science degree in Forest Technology. In addition, biology courses provide a key laboratory science experience for those students seeking to complete the general education requirements.

2. Program Specification

Programme code:	BSc-Bio	ECTS	240
Duration:	4 levels, 8 Semesters	Method of Attendance:	Full Time

Biology means the study of life. It is an exciting, wonderful and rapidly developing subject. Biology play an important role in overcoming the global challenges from disease to environment of the earth. The programme puts a strong emphasis on research and academic skills training across all years. The BSc in Biology is designed to provide students with a solid foundation in fundamentals aspects of plant, animal, ecology, genetics and microbiology. The programme provide skills in laboratory and practical skills that are appropriate to the study of living organisms. The programme is also designed to provide students with a wide-ranging exposure to the theory and practice of the courses, as well as an education in its diverse applications in medicine, industry, and environment.

Biology graduates are qualified for many different types of careers. The breadth of biology studied will determine the opportunities available, but regardless of the path chosen, students will have acquired a broad variety of subject-specific and general abilities that are applicable to jobs in both the biological and non-biological domains.

To graduate, a student shall have undergone 8 semesters of study including summer practical training. Course workload must meet the graduation requirements of the University based on minimum academic standards. The student must earn a minimum of 240 ECTS for the four-year programme.

Level one is focusing on fundamental topics such as Zoology, Botany, Chemistry, Biophysics and Mathematics. Level two will cover a range of concepts including biological systems and the importance of biology in real life. The students will explore topics such as Biochemistry, Entomology, Microbiology, Parasitology, Plant Taxonomy and Anatomy allowing them to develop their interests at a higher level. During level three and four, the students will study in-depth courses provide them an opportunities to learn specialist topics such as biotechnology, molecular biology, pathogenic bacteria, medical virology, pollution, histology and immunology. In the fourth year, more emphasis is placed on student centred learning exercises, workshops, and seminars. Year 4 has a compulsory undertaking a research project/dissertation.

3. Program Objectives

1. A comprehensive study of biological sciences, their applications and uses in society theoretically, scientifically and applicability.
2. Preparation of scientific cadres to work in the fields of medicine and health, agricultural and food industries.
3. Providing the students with the necessary scientific techniques and how to deal with devices and equipments that can be used in theoretical and applied studies.
4. Providing the state institutions, private and mixed sectors (medical, industrial and laboratory institutions) with specialized cadres.
5. Investigate and study the new developments in the biological sciences and keep updated with the scientific developments in this field and incorporate that within the prescribed curriculum.
6. To prepare students for a wide variety of post-baccalaureate paths, including graduate school, professional training programs, or entry level jobs in any area of biology.

4. Student Learning Outcomes

Biology is the study of the organization and operation of life at the molecular, cellular, organism, and population levels. Graduates obtain information on the historical, technical and social aspects of biology and utilize basic knowledge toward realizing broader concepts. The Department offers a Bachelor of Science in Biology with a concentration in General Biology; Pre-medicine / Pre-dentistry; Biotechnology/Molecular Biology and a minor in Secondary Education that leads to a Public Instruction License. Additionally, the Department offers courses to a large number of students from other departments and supports pre-professional programs. The Biology curriculum and experiences are designed to prepare students, in part, for entry into professional health programs, graduate studies, technical careers and education.

1. Graduates will be able to illustrate the structure and function cellular components and explain how they interact in a living cell.
2. Graduates will be able to formally communicate the results of biological investigations using both oral and written communication skills.
3. Graduates will be able to perform laboratory experiments and field studies, by using scientific equipment and computer technology while observing appropriate safety protocols.
4. Graduates will be able to demonstrate a balanced including the historical development of foundational concept of how scientific knowledge develops, theories and laws and the nature of science.
5. Graduates will be able to demonstrate scientific quantitative skills, such as the ability to conduct simple data analyses.
6. Graduates will be able to use critical-thinking and problem-solving skills to develop a research project and/or paper.

5. Academic Staff

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6. Credits, Grading and GPA

Credits

Diyala University is following the Bologna Process with the European Credit Transfer System (ECTS) credit system. The total degree program number of ECTS is 240, 30 ECTS per semester. 1 ECTS is equivalent to 25 hrs student workload, including structured and unstructured workload.

Grading

Before the evaluation, the results are divided into two subgroups: pass and fail. Therefore, the results are independent of the students who failed a course. The grading system is defined as follows:

GRADING SCHEME				
مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب - قيد المعالجة	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note:				
Number Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Calculation of the Cumulative Grade Point Average (CGPA):

The CGPA is calculated by the summation of each module score multiplied by its ECTS, all are divided by the program total ECTS.

CGPA of a 4-year B.Sc. degree:

$$CGPA = [(1^{st} \text{ module score} \times ECTS) + (2^{nd} \text{ module score} \times ECTS) + \dots] / 240$$

Curriculum/Modules

Semester 3 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
Bio-2311	Entomology I	77	50	5.00	C	Bio-1101
Bio-2312	Plant Anatomy	77	50	5.00	C	Bio-1201
Bio-2313	Invertebrates	77	42	5.00	C	Bio-1101
Bio-2314	Plant Groups	77	46	5.00	C	
Bio-2315	Biochemistry I	77	50	5.00	C	Bio-1212
Bio-2316	Microbiology I	77	50	5.00	C	

Semester 4 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
Bio-2411	Entomology II	77	65	5.00	C	Bio-2311
Bio-2412	Plant Taxonomy	77	60	5.00	C	Bio-2312
Bio-2413	Parasitology	77	60	5.00	C	
UD24	Extinct Baath Party Crimes	33	17	2.00	B	
Bio-2414	Biochemistry II	77	65	6.00	C	Bio-2315
Bio-2415	Microbiology II	77	65	7.00	C	Bio-2316

Contact

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**Ministry of Higher Education and Scientific Research
University of Diyala
College of Science
Department of Biology**



**MODULE DESCRIPTION FORM
FIRST CYCLE
LEVEL TWO**

**وصف المقرر لمسار بولونيا
المستوى الثاني
الدورة الاولى**

2025/2026

Semester Three

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Entomology I		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	Bio-2311		
ECTS Credits	5		
SWL (hr/sem)	127		
Module Level	2	Semester of Delivery	3
Administering Department	Dept. of Biology	College	College of Science
Module Leader	Sanaa Nagem Abed	e-mail	sanaa.abed@uodiyala.edu.iq
Module Leader's Acad. Title	Assist professor	Module Leader's Qualification	Ph.D.
Module Tutor	Sanaa Nagem Abed	e-mail	sanaa.abed@uodiyala.edu.iq
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	1/9/2025	Version Number	2

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	General Zoology	Semester	1
Co-requisites module	Entomology II	Semester	4

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Introducing the basic concept of Entomology. 2. Exposing the importance of insects to our life and Environment. 3. Understanding the external morphology of a typical insect. 4. Understanding the internal anatomy of a representative insect. 5. Exposing the varied types of insect growth, development and metamorphosis
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Make the students familiar with the concept Entomology and Arthropoda 2. Make the student able to recognize class Insecta 3. Identifying and Insects Integuments & Ecdysis 4. Recognizing insects 5. Recognizing insects body parts and head 6. Recognizing insects Thorax & appendages 7. Recognizing insects' Abdomen parts 8. Identifying and recognizing insects' digestive system parts 9. Identifying and recognizing insects' circulatory system parts and functions 10. Recognizing insects' Respiratory & circulatory systems 11. Recognizing insects' nervous system parts and functions 12. Identifying and recognizing insects' reproductive system

	13. Identifying and recognizing insects' growth & development 14. Recognizing how to control insects
Indicative Contents المحتويات الإرشادية	Throughout the course examples will be provided to link the underlying concepts with insects and environment

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Lessons of all units will be offered in an interaction lecture where student participation is mandatory either by forming small discussion groups in class, or by exchanging ideas and question one another. 2. Where applicable students will be assigned problems to solve and encouraged to assess one another. 3. Learning material will be supplied to students in class or uploaded on Blackboard learning management system. 4. Students will also be regularly referred to relevant section of the prescribed text book. 5. Most of the tutorial work will be done as self-study or with the assistance of a tutor. 6. The teacher will facilitate lectures and laboratory experiment sessions with the assistance of a tutor or laboratory demonstrator. Assessment will be both formative and summative. Formative assessment refers to assessment whose purpose is to monitor student learning but will not be graded. Summative assessment refers to assessment given to students for grading such as theory tests, practical tests and examination.

Student Workload (SWL) الحمل الدراسي للطلاب محسوب لـ 15 اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	77	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	50	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	3.3
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	125		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Entomology, Arthropoda general Characteristic of Arthropoda
Week 2	Class Insecta and its characteristics, the importance of Insects
Week 3	Insects Integuments & Ecdysis
Week 4	Insect body parts: Head & appendages
Week 5	Insect body parts: Thorax & appendages
Week 6	Insect body parts: Abdomen & appendages
Week 7	Mid-term Exam
Week 8	Insects Internal Anatomy: Digestive system
Week 9	Circulatory system
Week 10	Respiratory system
Week 11	Nervous system
Week 12	Reproductive system
Week 13	Insects' growth and development (Metamorphosis)
Week 14	Insects control
Week 15	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Collecting and preserving Insects
Week 2	Lab 2: Killing and preserving methods
Week 3	Lab 3: Insects head parts and orientations
Week 4	Lab 4: Antennae parts and modifications
Week 5	Lab 5: Insects mouth parts
Week 6	Lab 6: Modification of insects mouth parts
Week 7	Lab 7: Mid-term Exam
Week 8	Lab 8: Insects thorax
Week 9	Lab 9: Insects legs and their modification
Week 10	Lab 10: Insects wings and their modification
Week 11	Lab 11: Insects Anatomy (Periplant amiricana)
Week 12	Lab 12: Digestive system of Periplant (amiricana)
Week 13	Lab 13: Circulatory and Respiratory systems of Periplant amiricana
Week 14	Lab 14: Nervous system of Periplant amiricana
Week 15	Lab 15: Reproductive systems of Periplant amiricana

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Dyer, L. A. (2023). Essential Entomology.	Yes
Recommended Texts	Gullan, P.J & Cranston, P.S. (2010). The Insects, An outline of Entomology. 4th Ed. Wiley Blackwell Goddard, J. (2022). Public health entomology. CRC Press.	Yes
Websites	https://profiles.uonbi.ac.ke/foyeie/files/practical_training_manual_for_entomology.pdf https://shodhganga.inflibnet.ac.in/bitstream/10603/163876/9/09_chapter%206.pdf http://www.cassavabiz.org/production/proddocs/INSE-SCR.PDF	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جداً	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Plant Anatomy		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	Bio-2312		
ECTS Credits	5		
SWL (hr/sem)	127		
Module Level	2	Semester of Delivery	3
Administering Department	Dept. of Biology	College	College of Science
Module Leader	Khazal Dh. Wadi	e-mail	dr.khazal@uodiyala.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	PhD
Module Tutor	Khazal Dh. Wadi	e-mail	dr.khazal@uodiyala.edu.iq
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	1/9/2025	Version Number	2

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	General Botany	Semester	2
Co-requisites module	Plant Taxonomy	Semester	4

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. The study of plant anatomy seeks to clarify the differences in the composition of plant tissues that occur as a result of the different plant environment 2. This course deals with all types of plant tissues in each part of the plant. 3. Students learned to prepare anatomical sections from plant parts. 4. Developing skills in distinguishing between plant tissues through the use of a microscope.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	At the end of this module students should be able to: 1. Recognize the plant anatomy and plant body. 2. Recognition the plant cell. 3. Recognition the meristematic tissues and permanent tissues. 4. Recognition secretory cell & tissues. 5. Recognition the internal structure of plant body. 6. Recognition secondary growth. 7. Recognition the Complex stomata and Trichomes
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: ▪ Plant anatomy is one of the sciences specialized in studying plant tissues and determining the differences in the nature of the tissue depending on the

	nature of the environmental conditions in which the plant lives. It also studies its relationship to other sciences, such as ecology, cellular science, plant taxonomy, and others. ▪ In plant anatomy, scientists classify tissues into two main divisions: meristematic tissues and permanent tissues. The classification was based on the basis of origin, location within the plant, and physiological function. ▪ Explains the basic theories that show the origin of the developing meristematic peaks The indicative content of plant anatomy includes the study of the types of tissues, their function, and their location in the plant, as well as the study of the differences between the tissues of plant parts such as the root, stem, leaf, flower, seed, and fruit. And study the effects of the environment on the tissues
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Introducing the student to the internal structure of the plant body by dissecting its various organs, studying their sites, constituent tissues, adapting them to carry out their various functions, studying the types of cells that make them up and the function of each type. This science is in fact the study of the internal morphology of plant.
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب لـ 15 اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	77	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	50	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	3.3
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Plant anatomy, importance and objectives, identification of the primary plant body and its growth and secondary body and its growth
Week 2	Plant cell: its living and non-living components
Week 3	Cell wall, Pits and its types
Week 4	Meristematic tissues, theories of shoot & root apex
Week 5	Permanent tissue - Dermal tissue
Week 6	Parenchyma, collenchyma and sclerenchyma
Week 7	Exam 1
Week 8	Xylem & Phloem
Week 9	Secretory cells and tissues
Week 10	Complex stomata and Trichomes
Week 11	The internal structure of plant body
Week 12	Secondary growth in plant body
Week 13	Vascular cambium
Week 14	Periderm, cork cambium and bark.
Week 15	Exam 2

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction to plant body.
Week 2	Lab 2: Plant cell
Week 3	Lab 3: Plant cell
Week 4	Lab 4: Types of pith, Stomata and Trichomes
Week 5	Lab 5: Meristematic tissues
Week 6	Lab 6: Permanent tissues
Week 7	Lab 7: Dermal tissues
Week 8	Lab 8: Vascular tissues
Week 9	Lab 9 : Secretory tissues
Week 10	Lab 10: Internal Structure of root
Week 11	Lab 11: Internal Structure of stem
Week 12	Lab 12: Internal Structure of leaf
Week 13	Lab 13: Secondary growth
Week 14	Lab 14: Exam
Week 15	Lab 15: Review of previous laboratories

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Rudall, P. J. (2020). Anatomy of flowering plants: An introduction to plant structure and development. Cambridge university press.	Yes
Recommended Texts	De Craene, L. P. R. (2022). Floral diagrams: an aid to understanding flower morphology and evolution. Cambridge University Press.	Yes
Websites	https://www.botanicalartandartists.com/plant-forms-and-anatomy.html https://www.khanacademy.org/science/up-class-11th-biology/x6cdb38ba1d131d88:anatomy-of-flowering-plants	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جداً	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (فقد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Invertebrate		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	Bio-2313			
ECTS Credits	5			
SWL (hr/sem)	119			
Module Level	2	Semester of Delivery		3
Administering Department	Dept. of Biology		College	College of Science
Module Leader	Asraa Dawod Farhan		e-mail	asraa@uodiyala.edu.iq
Module Leader's Acad. Title	Lecturer		Module Leader's Qualification	Ph.D.
Module Tutor	Asraa Dawod Farhan		e-mail	asraa@uodiyala.edu.iq
Peer Reviewer Name			e-mail	
Scientific Committee Approval Date	1/9/2025		Version Number	2

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	General Zoology	Semester	1
Co-requisites module	Parasitology	Semester	4

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1- To understand the basic principles of Invertebrate. 2. Identifying and studying Invertebrate that infect humans and animals in detail 3. Studying Classification of each Invertebrate in terms of external appearance, life cycle, pathological and epidemiological causes, and methods of diagnosis and prevention.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	At the end of this module students should be able to: • Student Learning Outcome. • By the end of the course, the students are being able to. • Develop advanced academic knowledge about the concepts and principles of Invertebrate. • List the different terms associated with Invertebrate. • Detail knowledge about the Invertebrate and its applications. • Conducting discussions that enable the student to link causes with natural causes. • Having knowledge about the up-to-date advancing and development in this field of subject • In addition to learning practically the technique of examining, using, how to

	collect the different type of specimens and how to prepare it for examinations and be familiar with the results and writing reports. • Define the relationships between • Identify the most important phyla and species that infect humans and animals. • Discuss the different characteristics of Invertebrata.
Indicative Contents المحتويات الإرشادية	Emotional and value goals 1. Enable students to cooperate with each other in solving practical assignments. 2. Enabling students to focus on the topic of the lesson and harmony and interaction with it. 3. Enabling students to organize the information and data they receive during the lesson. 4. Enabling the students to recreate their way of thinking towards living beings and appreciating the greatness of the Almighty Creator.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Evaluation modalities: 1- Practical tests 2- Theoretical tests 3- Reports and studies 4- Daily exams with self-solving questions 5- Grades determined by homework

Student Workload (SWL) الحمل الدراسي للطلاب محسوب لـ 15 اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	77	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	42	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	2.8
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	125		

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	General introduction, history of science Invertebrate and importance
Week 2	Classification of Invertebrate
Week 3	Kingdom: Protista
Week 4	Class: Ciliophora
Week 5	Class: Sporozoa
Week 6	Phylum: Porifera
Week 7	Radiata: The Phylum Cnidaria (Pron: Nee- daria).
Week 8	Mid Exam
Week 9	Platyhelminthes (Flatworm)(Acoelomates)
Week 10	Round worms (Nematodes)
Week 11	Enterobius vermicularis (Pinworm)
Week 12	Phylum Mollusca
Week 13	Phylum: Aschelminthes
Week 14	Phylum: Annelida
Week 15	Final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Introduction and importance of Invertebrates and
Week 2	Classification Protozoa
Week 3	Introduction of Kingdom Protista and Classification Protozoa
Week 4	Class: flagellates (Euglena)
Week 5	Class: Sporozoa (malaria)
Week 6	Class: Ciliata (paramecium)
Week 7	Class: Sarcodina (amoeba)
Week 8	Phylum: Porifera and Classification
Week 9	Mid exam
Week 10	The Phylum Cnidaria characteristic and Classification
Week 11	Class: Hydrpzoa
Week 12	Phylum Platyhelminthes
Week 13	Class: Trematoda
Week 14	Phylum: Annelida
Week 15	Final exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Arumugan, N., & Murugan, T. (2019). A textbook of invertebrates. Saras Publication.	Yes
Recommended Texts	Lewbart, G. A. (Ed.). (2011). Invertebrate medicine. John Wiley & Sons.	YES
Websites	https://www.nwf.org/Educational-Resources/Wildlife-Guide/Invertebrates https://www.amnh.org/research/invertebrate-zoology	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية				
Module Title	Plant Groups		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☒ Seminar	
Module Code	Bio-2314			
ECTS Credits	5			
SWL (hr/sem)	123			
Module Level	2	Semester of Delivery		3
Administering Department	Dept. of Biology		College of Science	
Module Leader	Khalid Dheyaa Abdulwahid		e-mail	chechanikd75@uodiyala.edu.iq
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.
Module Tutor	Khalid Dheyaa Abdulwahid			chechanikd75@uodiyala.edu.iq
Peer Reviewer Name				
Scientific Committee Approval Date	1/9/2025	Version Number	2	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	General Botany	Semester	2
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Learn about the basics and systems of plant classification. 2. Identify the ecosystems and taxa of algae and classify them. 3. Identifying and classifying the ecosystems and taxa of archegoniate. 4. Identifying and classifying the ecosystems and taxa of gymnosperm. 5. Identifying and classifying the ecosystems and taxa of angiosperm. 6. Granting the student a bachelor's degree in the theoretical and practical aspects.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Identify the science of Introduction to plant groups and know the basis of their classification. And take an evolutionary view at plant groups. 2. Learn about the general outline of plant kingdom. 3. Definition of algae and the science of Algology. And its discipline deals with the morphology, taxonomy, phylogeny, biology, and ecology of algae. 4. Clarification of plant groups belonging cryptogams in terms of habitat, classification, vegetative and reproductive forms, and life cycles. 5. A detailed explanation of the types of algae, their classification, environment, methods of reproduction, environmental importance, as well as the risks posed by some types of algae. 6. A detailed explanation about archegonia - Bryophyta - Pteridophyta , , their classification, Habitat, methods of reproduction. 7. Clarification of plant groups belonging phanerogams in terms of habitat,

	classification, and life cycles. 8. A detailed explanation about flowering plants- Gymnosperms and Angiosperms, their classification and Habitat.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. A. Cognitive goals A1-The first level // Knowledge development // Develop the student's ability to recall what he learned about scientific facts related to algae, Archegoniate, and gymnosperms, angiosperms and enable students to obtain knowledge and understanding of the intellectual and applied framework in the science of botanical groups. A2-The second level // Improving comprehension level // Developing the ability to interpret, predict and deduce and enable students to obtain knowledge and understanding of the requirements in plant groups according to scientific standards. A3-The third level // Developing applied abilities (Application) // Informing students of modern techniques in algae and archegoniate through showing films and scientific research. A4-The fourth level // provide the student with the ability to analyze (analysis) // enable students to gain knowledge in algae and archegoniate. A5-The fifth level // Enabling students to gain knowledge about the role of algae and archegonia in the ecosystem and their importance in the periodic monitoring of the causes of pollution in the aquatic ecosystems. B. objectives and skills B1- Providing students with the additional basics related to the outputs of thinking and analysis. B2- Learn experimentation. B3- Improving the student's ability in observation. B4- Learn how to imitate and simulate. C. Emotional and value goals C1- Asking general questions during laboratory and theoretical lessons. C2- Assign students to report on various topics of algae, archegonia , gymnosperms, and angiosperms. C3- Enable students to conduct all experiments related to isolating, diagnosing and classifying algae and archegonia. C4- Discussing and directing graduation research for fourth-year students.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب لـ 15 اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	77	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	125		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to plant groups: Basis of classification-Five Kingdom System-Kingdom Plantae
Week 2	Algology (Phycology): Introduction to Phycology (definition and characteristics of algae)
Week 3	Division: Cyanophyta -Habitat and general characteristics- Classification of blue green algae
Week 4	Division: Chlorophyta-Habitat and general characteristics- Classification of green algae.
Week 5	Division: Chlorophyta- Growth, reproduction and life cycles in Chlorophyta.
Week 6	Division: Euglenophyta -Habitat and general characteristics- Classification of Euglenophyta.
Week 7	Division: Chrysophyta- Habitat and general characteristics- Classification of Chrysophyta.
Week 8	Division: Phaeophyta- Habitat and general characteristics- Classification of Phaeophyta.
Week 9	Division: Phaeophyta-Characteristics and life cycle of <i>Ectocarpus</i> sp., <i>Laminaria</i> sp. & <i>Fucus</i> sp.
Week 10	Division: Rhodophyta - Habitat and general characteristics- Classification of Rhodophyta.
Week 11	Division : Rhodophyta - Characteristics and life cycle of <i>Bangia</i> sp. and <i>Nemalion</i> sp.
Week 12	Archegoniate: Division: Bryophyta-Habitat and general characteristics-Classification of mosses.
Week 13	Archegoniate: Bryophyta- Characteristics and life cycle of <i>Anthoceros</i> sp. and <i>Sphagnum</i> sp.
Week 14	Archegoniate: Division: Pteridophyta - Habitat and general characteristics- Classification of ferns.
Week 15	Phanerogams: Habitat and general characteristics of Gymnosperm and Angiosperm.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: General Student Lab Guidelines
Week 2	Lab 2: Introduction to plant groups-The basis of their classification, an evolutionary view.
Week 3	Lab 3: Cyanophyta (Blue-green algae)- General characteristics, Diversity of vegetative forms.
Week 4	Lab 4: Chlorophyta (Green algae)- Unicellular and colonial forms-General characteristics.
Week 5	Lab 5: Chlorophyta- Filamentous forms- General characteristics- classification and reproduction.
Week 6	Lab 6: Charophyta - General characteristics, Principles of classification.
Week 7	Lab 7: Euglenophyta - General characteristics, Principles of classification.

Week 8	Lab 8: Chrysophyta, Diatoms - General characteristics, Principles of classification.
Week 9	Lab 9: Phaeophyta and Giant brown algae- General characteristics, Principles of classification.
Week 10	Lab 10: Rhodophyta (red algae) - General characteristics, Principles of classification.
Week 11	Lab 11: Bryophyta (Mosses)- Hepaticae -Characteristics and development.
Week 12	Lab 12: Anthocerotophyta -Sphenopsida- General characteristics, Principles of classification.
Week 13	Lab 13: Low vascular plants -Psilophyta - General characteristics, Principles of classification.
Week 14	Lab 14: Arthropophyta - Equisetum - General characteristics, Principles of classification.
Week 15	Lab 15: Pteridophyta -Ferns - General characteristics, Principles of classification.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Kushwaha, A. K., & Shukla, M. K. (2020). Algae: A textbook of botany.	Yes
Recommended Texts	Bellinger, E. G., & Sige, D. C. (2010). Freshwater Algae: Identification and Use as Bioindicators John Wiley & Sons. Ltd. 1th edition. pp, 284.	Yes
Websites	https://www.britannica.com/science/algae/Classification-of-algae	

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Biochemistry I		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	Bio-2315		
ECTS Credits	5		
SWL (hr/sem)	127		
Module Level	2	Semester of Delivery	
Administering Department	Dept. of Biology	College	College of Science
Module Leader	Waseem Yousif Mohammed	e-mail	waseemyousif@uodiyala.edu.iq
Module Leader's Acad. Title	Assist. Prof.	Module Leader's Qualification	Ph.D.
Module Tutor	Waseem Yousif Mohammed	e-mail	waseemyousif@uodiyala.edu.iq
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	1/9/2025	Version Number	2

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Organic Chemistry	Semester	2
Co-requisites module	Biochemistry II	Semester	4

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	This module aims to teach you core biochemistry concepts including the structure of Carbohydrates, Lipids, Amino acids, proteins, and nucleic acids. The module will also provide a background to fundamental aspects of chemistry. This module provides you with the core knowledge and skills to enhance your performance in biological chemistry. It is a pre-requisite for second-year modules in Biochemistry II related to metabolism.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On completing the module, you will be able to... 1. Explain the basic concepts of biochemistry 2. Recall the range and structures of biological molecules 3. Summarise the relationship between chemical structure and biological function 4. Communicate key practical skills relating specifically to biochemistry 5. Illustrate essential elementary chemistry or structural organic chemistry 6. Describe the basic principles of biochemistry/chemical biology 7. Evaluate essential key facts and theory in a subdiscipline of the biosciences 8. Describe and begin to evaluate aspects of biochemistry concerning textbook material
Indicative Contents المحتويات الإرشادية	As part of this module, you will undertake Not less than thirteen laboratory sessions in the teaching laboratory (of up to 30 students) that are of 2 hrs in duration. These sessions will be undertaken in groups, and some sessions involve fine laboratory work.

Breaks are possible and students can leave the laboratory for short periods.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies

Lessons of all units will be offered in an interactive lecture where student participation is mandatory either by forming small group discussions in class, exchanging ideas, and questioning another. Where applicable students will be assigned problems to solve and encouraged to assess one another. Learning material will be supplied to students in class or uploaded on the Blackboard learning management system. Students will also be regularly referred to relevant sections of the prescribed textbook. Most of the tutorial work will be done as self-study or with the assistance of a tutor. The teacher will facilitate lectures and laboratory experiment sessions with the assistance of a tutor or laboratory demonstrator. Assessment will be both formative and summative. Formative assessment refers to an assessment whose purpose is to monitor student learning but will not be graded. Summative assessment refers to assessments given to students for grading such as theory tests, practical tests, and examinations.

Student Workload (SWL)

الحمل الدراسي للطلاب محسوب لـ 15 اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	77	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	50	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	3.3
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Introduction to biochemistry, cell chemistry
Week 2	Carbohydrates: sugars monosaccharides
Week 3	disaccharides
Week 4	polysaccharides
Week 5	Lipids, fatty acids.
Week 6	other compounds lipids
Week 7	Amino acids, Classification of Amino Acids

Semester Three

Week 8	Exam
Week 9	Amino acid reactions
Week 10	Peptides & Proteins
Week 11	Classification of Proteins
Week 12	nucleic acids, synthesis chemistry
Week 13	Pyrimid and purines bases
Week 14	nucleotides, nucleosides, DNA is RNA
Week 15	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Molisch,s Test
Week 2	Benedict's test
Week 3	Barfoed's Test
Week 4	Bial's Test
Week 5	Seliwanoff's Test
Week 6	Sucrose Hydrolysis Test
Week 7	Iodine Test
Week 8	Exam
Week 9	Qualitative tests of lipids: Solubility test
Week 10	Saponification test
Week 11	Detecting desaturation by copper acetate) & Iodine Test
Week 12	Salkowski Test & Liberman-Burchards Test
Week 13	Acrolin Test
Week 14	Rancidity
Week 15	Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Nelson, D. L. (2021). Lehninger Principles of Biochemistry 5th Edition. Proteins, 5, 6.	Yes
Recommended Texts	Rodwell, V. W., Bender, D., & Botham, K. M. (2018). Harper's illustrated biochemistry. McGraw-Hill.	No
Websites	https://ocw.mit.edu/courses/5-111-principles-of-chemical-science-fall-2008/ https://ocw.mit.edu/courses/7-012-introduction-to-biology-fall-2004/download/	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (فقد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Microbiology I		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	Bio-2316			
ECTS Credits	5			
SWL (hr/sem)	127			
Module Level	2	Semester of Delivery		3
Administering Department	Dept. of Biology		College	College of Science
Module Leader	Zainab Mohammed Nsaif		e-mail	dr.zainab@uodiyala.edu.iq
Module Leader's Acad. Title	Professor		Module Leader's Qualification	PhD
Module Tutor	Zainab Mohammed Nsaif		e-mail	dr.zainab@uodiyala.edu.iq
Peer Reviewer Name			e-mail	
Scientific Committee Approval Date	1/9/2025		Version Number	2

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	
Co-requisites module	Microbiology II	Semester	4

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Clinical microbiology deals with microorganisms such as pathogenic bacteria, viruses, fungi and parasites which are medically important and cause human diseases. Generally, microorganisms can cause a tremendous change on our planet and our life, there is a scientific speech says if “there is no microorganism on our earth there is no life on our planet” otherwise is also true because there are some dangerous and infectious microorganism which cause a dangerous airborne, foodborne and waterborne diseases that some of them are fatal and threaten human life. Evolution in the field of Clinical microbiology and exactly about identification of pathogenic microorganisms and the methods of chemotherapy and prophylaxes has saved the life of millions of peoples on our planet. Students will acquire a broad understanding of the basics of microbiology laboratories in terms of sterilization methods and the rules that must be adhered to when dealing with the tools and equipment used, in addition to using the laboratory techniques necessary to isolate these organisms and identify their shapes and characteristics. The student will also learn the techniques necessary to identify the types of these organisms and their groups, methods of counting, isolating and staining them.

	Course Objective: 1. To understand the basic principles of Clinical Microbiology. 2. To provide the student with the basic knowledge of microorganisms in general 3. To study the main characteristics of microbes of medical importance and their identification. 4. To teach aseptic techniques. 5. To provide an understanding of antimicrobial agents and infectious diseases. 6. To teach the basic immunological principles and methods for the study of immunological disorders.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	At the end of this module students should be able to: • Develop advanced academic knowledge about the concepts and principles of Medical Microbiology. • Cover the importance of Microbiology and the history background of this subject. • Detail knowledge about the Medical Microbiology and its applications. • Having knowledge about the up-to-date advancing and development in this field of subject • They could be familiar with the modest instruments in the medical labs like PCR and ELISA. • In addition to learning practically the technique of examining, using, how to collect the different type of specimens and how to prepare it for examinations and be familiar with the results and writing reports. • Recognition the methods of sterilization in the laboratory. • Tools and equipment used in the laboratory. • Staining methods and types of dyes used to identify the types of microorganisms. • Methods of counting bacteria. • Techniques for the process of culturing on plates.
Indicative Contents المحتويات الإرشادية	The module will include: • Class attendance is regularly 85-90% of lectures each week 5 minutes before the lecture is a must. The students should also submit homework and assignments, accomplish extra classroom requirements such as preparing scientific reports, presentation and seminars and also be ready for performing quizzes, mid-term and final exams, participate in the laboratory works (practical labs) in order to pass successfully. • Basics of working in the laboratory. • Methods of dealing with tools and equipment in the laboratory.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Every student or small grouping students must prepare a report about a subject regarding clinical microbiology. Each report must include the following information: the logo of university or the Institute, the name of college or department, student's name, the title of the report, short description and brief introduction about the subject, aims of the report, short review literature, prospects and overviews and finally the references. Each student or small group is present his/her/there reports as a seminar (presentation) to confirm their capability to speak about a scientific subject in front of gathering in a teaching hall.
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	All lessons held in the laboratory will be practical, with the participation of all students, who will be distributed into small groups to obtain the required results and encourage the spirit of competition among students and encouragement among groups to complete the experiment in the required manner.
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Student Workload (SWL) الحمل الدراسي للطلاب محسوب لـ 15 اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	77	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	50	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	3.3
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	125		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Microbiology
Week 2	The Relevance and Scope of Microbiology, Microscopy and Specimen Preparation
Week 3	A Brief Survey of Microbes as Friends and Foes, General Characteristics of
Week 4	General Characteristics of Bacteria
Week 5	First Monthly exam
Week 6	General Characteristics of Fungi, General Characteristics of Viruses
Week 7	General Characteristics of Algae
Week 8	General Characteristics of Protozoa
Week 9	Microbial Growth, Reproduction and Control, Microbial Growth
Week 10	Measurement of Microbial Growth
Week 11	Second Monthly exam
Week 12	Physical Methods of Controlling Microbial Growth
Week 13	Chemical Methods of Controlling Microbial Growth
Week 14	Systematic Classification of Microorganisms

Week 15	Review
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Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab1 An introduction to microbiology, aseptic technique and safety
Week 2	Lab2 Tools and Equipment used in Microbiology Lab
Week 3	Lab3 Culture Media
Week 4	Lab4 Bacterial Staining
Week 5	Lab5 Type of the Stains/ Differential stain
Week 6	Lab6 Selective stain
Week 7	Lab7 Antibiotics
Week 8	Mid exam
Week 9	Lab8 Bacterial Count
Week 10	Lab9 Turbidimetry Determinations
Week 11	Lab10 Pour Plate Method
Week 12	Lab11 Bacterial Culture Techniques
Week 13	Lab12 Colony morphology
Week 14	Lab13 Yeast and molds
Week 15	Final exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Dubey, R. C., & Maheshwari, D. K. (2023). A textbook of microbiology. S. Chand Publishing.	Yes
Recommended Texts	Green, L. H., & Goldman, E. (Eds.). (2021). Practical handbook of microbiology. CRC press. Parija, S. C. (2023). Textbook of microbiology and immunology. Berlin, Heidelberg, Germany: Springer.	Yes
Websites	https://microbiologyinfo.com/ https://microbe.net/resources/microbiology-web-resources/	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings

Semester Three

	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (فقد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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

Semester Four

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Entomology II		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	Bio-2411			
ECTS Credits	5			
SWL (hr/sem)	142			
Module Level	2	Semester of Delivery		
Administering Department		Dept. of Biology	College	College of Science
Module Leader	Sanaa Nagem Abed		e-mail	sanaa.abed@uodiyala.edu.iq
Module Leader's Acad. Title		Assist professor	Module Leader's Qualification	Ph.D.
Module Tutor	Sanaa Nagem Abed		e-mail	sanaa.abed@uodiyala.edu.iq
Peer Reviewer Name			e-mail	
Scientific Committee Approval Date		1/9/2025	Version Number	2

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Entomology I	Semester	3
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Providing basic concepts of taxonomic hierarchy, identification, taxonomic characters, variations, taxonomic keys. 2. Expose the student to the concepts of Insect collection, identification and preservation. 3. Introduce the students to the main orders and families of insects
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Make the students familiar with Insects Divisions and orders 2. Make the student able to recognize insects of Subclass : Apterygota 3. Make the student able to recognize insects of Subclass: Pterygota 4. Make the student able to recognize insects of orders: Odonata, Plecoptera, Grylloblatodea and their characteristics 5. Make the student able to recognize insects of orders: Orthoptera, Phasmodia, Dermaptera 6. Recognizing insects of orders Embioptera, Dictyoptera, Isoptera 7. Recognizing insects of order: Pseoptera, Anoplura, Mallophaga 8. Recognizing insects of order Thysanoptera 9. Recognizing insects of order Neuroptera 10. Recognizing insects of order Lepidoptera 11. Recognizing insects of order Coleoptera 12. Recognizing insects of order Diptera

Semester Four

	13. Recognizing insects of order Hymenoptera
Indicative Contents المحتويات الإرشادية	Throughout the course examples will be provided to link the underlying concepts with insects and the environment.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Lessons of all units will be offered in an interaction lecture where student participation is mandatory either by forming small discussion groups in class, or by exchanging ideas and question one another. 2. Where applicable students will be assigned problems to solve and encouraged to assess one another. 3. Learning material will be supplied to students in class or uploaded on Blackboard learning management system. 4. Students will also be regularly referred to relevant section of the prescribed text book. 5. Most of the tutorial work will be done as self-study or with the assistance of a tutor. 6. The teacher will facilitate lectures and laboratory experiment sessions with the assistance of a tutor or laboratory demonstrator. Assessment will be both formative and summative. Formative assessment refers to assessment whose purpose is to monitor student learning but will not be graded. Summative assessment refers to assessment given to students for grading such as theory tests, practical tests and examination.

Student Workload (SWL) الحمل الدراسي للطلاب محسوب لـ 15 اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	77	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	65	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	4.3
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	143		

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

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري

Semester Four

	Material Covered
Week 1	Introduction to Taxonomy of Insects
Week 2	Division: Apterygota (orders: Thysanura, Diplura, Protura, Collembola)
Week 3	Division: Pterygota (Endopterygota & Exopterygota)
Week 4	Taxonomy of Orders Odonata, Plecoptera, Grylloblattodea
Week 5	Taxonomy of Orders Orthoptera, Phasmodia, Dermaptera
Week 6	Taxonomy of orders Embioptera, Dictyoptera, Isoptera
Week 7	Mid-term Exam
Week 8	Taxonomy of order: Psocoptera, Anoplura, Mallophaga
Week 9	Taxonomy of order Thysanoptera
Week 10	Taxonomy of order: Psocoptera, Anoplura, Mallophaga
Week 11	Taxonomy of order Neuropter
Week 12	Taxonomy of order Lepidoptera
Week 13	Taxonomy of order Coleoptera
Week 14	Taxonomy of order Diptera
Week 15	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Examining insects collections
Week 2	Lab 2: Introducing the student to insects of subclass : Apterygota
Week 3	Lab 3: Introducing the student to subclass: Pterygota
Week 4	Lab 4: Introducing the student to order: Odonata, Plecoptera, Grylloblattodea and their
Week 5	Lab 5: Introducing the student to orders Orthoptera, Phasmodia, Dermaptera and their
Week 6	Lab 6: Examining orders Embioptera, Dictyoptera, Isoptera and their characteristics
Week 7	Lab 7: Mid-term Exam
Week 8	Lab 8: Examining orders order: Psocoptera, Anoplura, Mallophaga
Week 9	Lab 9: Examining orders order Thysanoptera
Week 10	Lab 10: Examining order Neuropter
Week 11	Lab 11: Examining order Lepidoptera
Week 12	Lab 12: Examining order Coleoptera
Week 13	Lab 13: Examining order Diptera
Week 14	Lab 14: Examining order Hymenoptera
Week 15	Lab 15: Reexamining all the slides and insects collection to prepare for the final exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	McGavin, G. C., & Davranoglou, L. R. (2023). Essential entomology. Oxford University Press.	Yes
Recommended Texts	Rivers, D. B., & Dahlem, G. A. (2022). The science of forensic entomology. John Wiley & Sons. Kimball, J. A. (2023). Entomology and Nematology. Guide to Sources for Agricultural and Biological	No
Websites	https://profiles.uonbi.ac.ke/foyeike/files/practical_training_manual_for_entomology.pdf https://shodhganga.inflibnet.ac.in/bitstream/10603/163876/9/09_chapter%206.pdf http://www.cassavabiz.org/production/proddocs/INSE-SCR.PDF	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Plant Taxonomy		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	Bio-2412			
ECTS Credits	5			
SWL (hr/sem)	137			
Module Level	2	Semester of Delivery		4
Administering Department		Dept. of Biology	College	College of Science
Module Leader	Khazal Dh. Wadi		E-mail	dr.khazal@uodiyala.edu.iq
Module Leader's Acad. Title		Professor	Module Leader's Qualification	Ph.D.
Module Tutor		Khazal Dh. Wadi	E-mail	dr.khazal@uodiyala.edu.iq
Peer Reviewer Name		Khazal Dh. Wadi	E-mail	dr.khazal@uodiyala.edu.iq
Scientific Committee Approval Date		1/9/2025	Version Number	2

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Plant Anatomy	Semester	3
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	A- Cognitive goals A1- Level 1 Knowledge Development: Developing the student's ability to recall what he learned about morphology of plant body. A 2- The second level is to improve the level of understanding (comprehension) and to develop the ability to interpret, predict and draw conclusions. A 3- The third level is the development of applied capabilities ((Application). A 4- The fourth level gives the student the ability to analyze A5- Level 5 Developing the student's ability to integrate ideas and information (synthesis level), which is the opposite of analysis A6- Level Six: Evaluation (Developing the student's ability to judge the value of the learned material. B - The soft skills objectives of the course. B1 - Improving the student's ability to observe (Observation). B 2 - To learn how to imitate and imitate (Imitation) B 3 - To learn the method of experimentation
Module Learning Outcomes	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Recognize the main fields of plant taxonomy. 2. List the general terms of plant.

Semester Four

مخرجات التعلم للمادة الدراسية	3. Recognition the parts of plant. 4. Recognition pollination and its types. 5. Recognition the taxonomic categories 6. Recognition herbarium 7. Recognition botanical garden
Indicative Contents المحتويات الإرشادية	Indicative content includes the following.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	77	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	60	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	143		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	5% (5)	5	LO #1, #2 and #10, #11
	Assignments				
	Projects / Lab. Report	1	15% (15)	Continuous	All
		1	5% (5)	5	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	25 % (25)	2	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

Week	Material Covered
Week 1	Introduction – plant taxonomy, importance, history
Week 2	General plant terms
Week 3	The Fields of plant taxonomy, classification Systems
Week 4	Morphological study of Roots, stems, Leaves
Week 5	Morphological study of Flower
Week 6	Androecium and Gynoecium
Week 7	Exam 1
Week 8	Inflorescence
Week 9	Fruits & Seeds

Semester Four

Week 10	pollination
Week 11	Taxonomic Categories
Week 12	The evolutionary importance of reproductive systems
Week 13	Herbarium& Herbarium specimens
Week 14	Botanical garden
Week 15	Exam 2
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to plant taxonomy.
Week 2	Lab 2: preparing plant specimens.
Week 3	Lab 3: scientific description of a plant specimen
Week 4	Lab 4: Floral formula
Week 5	Lab 5: taxonomic keys
Week 6	Lab 6: plant families
Week 7	Lab 7: plant families
Week 8	Lab 8: Scientific trip
Week 9	Lab9: plant families
Week 10	Lab 10: plant families
Week 11	Lab 11: plant families
Week 12	Lab 12: plant families
Week 13	Lab 13: plant families
Week 14	Lab 14: Exam
Week 15	Lab 15: Review of previous laboratories.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Singh, G. (2019). Plant systematics: an integrated approach. CRC Press.	Yes
Recommended Texts	Pandey, A. K., & Kasana, S. (2021). Plant Systematics. CRC Press. Uddin, M. Z., & Rahman, M. O. Plant Taxonomy and Systematics. Centennial Special Book, 197.	Yes
Websites	https://www.ipni.org/ https://www.aspt.net/	

Semester Four

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Parasitology		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	Bio-2413		
ECTS Credits	5		
SWL (hr/sem)	137		
Module Level	2	Semester of Delivery	
Administering Department	Dept. of Biology	College	College of Science
Module Leader	Asraa Dawod Farhan	e-mail	asraa@uodiyala.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Asraa Dawod Farhan	e-mail	asraa@uodiyala.edu.iq
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	1/9/2025	Version Number	2

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Invertebrates	Semester	3
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To understand the basic principles of parasitology. 2. Identifying and studying parasites that infect humans and animals in detail. 3. Studying aspects of the life of each parasite in terms of external appearance, life cycle, pathological and epidemiological causes, and methods of diagnosis and prevention.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	At the end of this module students should be able to: ▪ Student Learning Outcome. ▪ By the end of the course, the students are being able to. ▪ Develop advanced academic knowledge about the concepts and principles of parasitology. ▪ List the different terms associated with parasitology. ▪ Detail knowledge about the parasitology and its applications. ▪ Conducting discussions that enable the student to link causes with natural causes. ▪ Having knowledge about the up-to-date advancing and development in this field of subject. ▪ In addition to learning practically the technique of examining, using, how to collect the different type of specimens and how to prepare it for examinations and be familiar with the results and writing reports.

Semester Four

	- Define the relationships between the parasite and the host. - Identify the most important phylums and species that infect humans and animals. - Discuss the different characteristics of parasites.
Indicative Contents المحتويات الإرشادية	Emotional and value goals: 1. Enable students to cooperate with each other in solving practical assignments. 2. Enabling students to focus on the topic of the lesson and harmony and interaction with it. 3. Enabling students to organize the information and data they receive during the lesson. 4. Enabling the students to recreate their way of thinking towards living beings and appreciating the greatness of the Almighty Creator.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Evaluation modalities 1- Practical tests 2- Theoretical tests 3- Reports and studies 4- Daily exams with self-solving questions 5- Grades determined by homework
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب لـ 15 أسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	77	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	60	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	143		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
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Semester Four

Week 1	General introduction, history of science Parasites and public relations among animals
Week 2	Parasitism features, types Parasitism, types parasites, and hosts
Week 3	Protozoa and Protozoan diseases and life cycle
Week 4	Complementing the genera belonging to the Phylum Protozoa
Week 5	Tissue and Blood flagellates (<i>Leishmania</i> spp.)
Week 6	Flagellate: Family Trypanosomatida, Genus <i>Trypanosoma</i> (African trypanosomiasis/African sleeping sickness and American trypanosomiasis)
Week 7	Phylum Ciliophora
Week 8	Mid Exam
Week 9	Phylum Sporozoa (blood and tissue protozoan parasites) (<i>Plasmodium</i> species)
Week 10	<i>Toxoplasma gondii</i> (toxoplasmosis)
Week 11	Phylum Platyhelminthes
Week 12	<i>Heterophyes heterophyes</i> (Heterophyiasis)
Week 13	Liver and lung trematodes (Flukes)
Week 14	<i>Fasciola hepatica</i> (Sheep liver fluke infection/fascioliasis)
Week 15	Final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Introduction of parasite: Properties of phylum Protozoa: 1- Class: Flagellata; 2- Sarcodina; 3- Ciliata; 4- Sporozoa
Week 2	Class of Sarcodina, study of pathogenic genera such as <i>Entamoeba histolytica</i>
Week 3	Class of Flagellates, study of pathogenic genera such as <i>Giardia lamblia</i> , <i>Trichomonas</i>
Week 4	Complement of class flagellates, Tissue and Blood flagellates
Week 5	Class of Ciliata study of pathogenic genera such as <i>Balantidium coli</i>
Week 6	Class of Sporozoa study of pathogenic genera such as <i>Plasmodium</i> , <i>Toxoplasma</i>
Week 7	Mid exam
Week 8	Phylum: Platyhelminthes, properties and classification
Week 9	Class 1 of Platyhelminthes; Cestoda and his pathogenic genera
Week 10	Class 2 of Platyhelminthes; Nematoda and his pathogenic genera
Week 11	Phylum Nematelminthes, properties and classification
Week 12	Pathogenic genera of Phylum Nematelminthes, such as <i>Enterobius</i>
Week 13	Phylum Annelida, properties and classification
Week 14	Classes of Annelida such as Oligochaeta, Hirudinea
Week 15	Final exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Gardner, S. L., & Gardner, S. A. (2025). Concepts in Animal Parasitology.	Yes
Recommended Texts	Mathison, B. A., & Pritt, B. S. (2022). Medical parasitology. Henry's Clinical Diagnosis and Management by Laboratory Methods. 24th ed. Philadelphia, PA: Elsevier.	YES
Websites	https://www.cdc.gov/parasites/index.html https://bsp.uk.net/Home	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
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	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	جرائم نظام البعث في العراق		Module Delivery		
Module Type	Basic learning activities		☒ Theory ☒ Lecture ☐ Lab ☐ L Tutorial ☐ Practical ☒ Seminar		
Module Code	UD24				
ECTS Credits	2				
SWL (hr/sem)	50				
Module Level		2	Semester of Delivery		4
Administering Department		جميع اقسام الكلية	College	College of Science	
Module Leader	Kamal Sabbar Breseem		e-mail	kamalsabbar@uodiyala.edu.iq	
Module Leader’s Acad. Title			Module Leader’s Qualification		MSc.
Module Tutor	Kamal Sabbar Breseem		e-mail	kamalsabbar@uodiyala.edu.iq	
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date		1/9/2025	Version Number		2

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. التعرف على ماهية الجريمة لغة واصطلاحاً وماهية أقسام الجرائم. 2. التعرف على جرائم نظام البعث وفق قانون المحكمة الجنائية العراقية العليا عام 2005م. 3. تنمية وعي الطلب بجرائم نظام البعث وفق توثيق قانون المحكمة الجنائية العراقية العليا لسنة 2005م. 4. دراسة الجرائم التي ارتكبتها نظام البعث على مدى سنوات طويلة واثارها النفسية والاجتماعية. 5. التعرف على صور انتهاكات حقوق الانسان وجرائم السلطة والتعرف على الجرائم البيئية لنظام البعث في العراق. 6. تعزيز الوعي بحقيقة ما جرى من مآسي المقابر الجماعية المرتكبة من النظام البعثي في العراق.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. تمكين الطالب من معرفة المفاهيم النظرية للجرائم وأركان الجرائم . 2. تمكين الطالب من معرفة أقسام الجرائم . 3. تمكين الطالب من معرفة قانون المحكمة الجنائية العراقية العليا لسنة 2005. 4. فهم تشكيل المحكمة الجنائية العراقية العليا لسنة 2005 والتعرف على تشكيل المحكمة إجراءات التقاضي امام المحكمة. 5. يتعلم الطالب أنواع الجرائم الدولية على وفق النظام الاساسي للمحكمة الجنائية الدولية. 6. معرفة الطالب بالآثار النفسية والاجتماعية لجرائم نظام البعث. 7. يتمكن الطالب من فهم موقف النظام البعثي من الدين من خلال فهم عقيدة النظام السياسي سبيلاً لفهم موقف النظام من الدين. 8. يتمكن الطالب من التعرف على صور انتهاكات القوانين العراقية وانتهاكات حقوق الانسان وجرائم السلطة. 9. تمكين الطالب من التعرف على بعض قرارات الانتهاكات السياسية والعسكرية لنظام البعث. 10. يتعرف الطالب على أماكن السجون والاحتجاز لنظام البعث. 11. معرفة الطالب بالجرائم البيئية وبآثار الجرائم البيئية لنظام البعث، ويتعرف جرائم المقابر الجماعية.

Semester Four

Indicative Contents المحتويات الإرشادية	الجزء الأول : جرائم نظام البعث وفق قانون المحكمة الجنائية العراقية العليا لعام 2005م، والجرائم النفسية والاجتماعية وآثارها وابرز انتهاكات النظام البعثي في العراق: التعريف بالجريمة لغة وأصطلاحاً، اركان واقسام الجريمة (2 ساعة). جرائم نظام البعث وفق قانون المحكمة الجنائية العراقية العليا عام 2005م : أنواع الجرائم الدولية، القرارات الصادرة من المحكمة الجنائية العليا (2 ساعة). وابرز القضايا التي نظرت فيها المحكمة (2 ساعة). الجرائم النفسية والاجتماعية وآثارها وابرز انتهاكات النظام البعثي في العراق: الجرائم النفسية، اليات الجرائم النفسية (2 ساعة). آثار الجرائم النفسية ، الجرائم الاجتماعية (2 ساعة) . عسكرة المجتمع، موقف النظام البعثي من الدين (2 ساعة) . انتهاكات القوانين العراقية، صور انتهاكات حقوق الانسان (2 ساعة) . جرائم السلطة، بعض قرارات الانتهاكات السياسية والعسكرية لنظام البعث، أماكن السجون والاحتجاز لنظام البعث (2 ساعة). الجزء الثاني : الجرائم البيئية لنظام البعث في العراق، جرائم المقابر الجماعية : الجرائم البيئية لنظام البعث في العراق: التلوث الحربي والاشعاعي – أستعمال الاسلحة المحرمة دولياً ومخاطر اللغام. (2 ساعة). التلوث بالمواد المشعة، أثار أستخدام الاسلحة المحرمة دولياً (2 ساعة). تدمير المدن والقرى (سياسة الارض المحروقة): قصف المدن، قصف العتبات المقدسة والمساجد والحسينيات، معركة نهر جاسم ، حرق أبار النفط (2 ساعة). تجفيف الاهوارو أثارها البيئية والاجتماعية والاقتصادية (2 ساعة). ، تجريف بساتين النخيل والاشجار والمزروعات (2 ساعة). جرائم المقابر الجماعية وموقف الامم المتحدة منها (2 ساعة). احداث المقابر الجماعية المرتكبة من النظام البعثي في العراق، التصنيف الزمني لمقابر ابادة الجماعية في العراق للمدة 1963- 2003 (2 ساعة).
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1- زيادة وعي الطالب بالجرائم التي ارتكبها نظام البعث في العراق وحقيقة ما جرى من مآسي وويلات بحق الشعب العراقي. 2- اكتساب الطالب ثقافة عامة بماهية الجرائم واركانها واقسامها وموقف المشرع العراقي منها. 3- زيادة وعي الطالب بموقف القانون الدولي والمحاكم الجنائية الدولية من الجرائم والانتهاكات التي ترتكبها الانظمة السلطوية.

Student Workload (SWL) الحمل الدراسي للطلاب محسوب لـ 15 أسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعياً	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعياً	1.1
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	50		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered

Semester Four

Week 1	محاضرة تعريفية عن المادة وأهميتها.
Week 2	التعريف بالجريمة لغة واصطلاحاً، أقسام الجريمة، جرائم نظام البعث وفق قانون المحكمة الجنائية العراقية العليا عام 2005م، أنواع الجرائم الدولية.
Week 3	القرارات الصادرة من المحكمة الجنائية العليا، وأبرز القضايا التي نظرت فيها المحكمة.
Week 4	الجرائم النفسية، آليات الجرائم النفسية.
Week 5	آثار الجرائم النفسية، الجرائم الاجتماعية.
Week 6	عسكرة المجتمع، موقف النظام البعثي من الدين.
Week 7	انتهاكات القوانين العراقية، صور انتهاكات حقوق الإنسان، جرائم السلطة.
Week 8	بعض قرارات الانتهاكات السياسية والعسكرية لنظام البعث، أماكن السجون والاحتجاز لنظام البعث.
Week 9	الجرائم البيئية لنظام البعث في العراق: التلوث الحربي والإشعاعي - استعمال الأسلحة المحرمة دولياً ومخاطر الألغام.
Week 10	التلوث بالمواد المشعة، آثار استخدام الأسلحة المحرمة دولياً.
Week 11	تدمير المدن والقرى (سياسة الأرض المحروقة).
Week 12	تجفيف الأهوار أثارها البيئية والاجتماعية والاقتصادية.
Week 13	تجريف بساتين النخيل والأشجار والمزروعات.
Week 14	جرائم المقابر الجماعية، أحداث المقابر الجماعية المرتكبة من النظام البعثي في العراق.
Week 15	التصنيف الزمني لمقابر الإبادة الجماعية في العراق للمدة 1963 - 2003.
Week 16	الامتحان النهائي

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	المنهج المقرر الدراسي للجامعات الحكومية و الأهلية كافة كتاب وزارة التعليم والبحث العلمي ذي العدد (ت م 3 / 7588 في 2023/10/19)	نعم
Recommended Texts		لا
Websites		

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Biochemistry II		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	Bio-2414		
ECTS Credits	6		
SWL (hr/sem)	142		
Module Level	2	Semester of Delivery	
Administering Department	Dept. of Biology	College	College of Science
Module Leader	Waseem Yousif Mohammed	e-mail	waseemyousif@uodiyala.edu.iq
Module Leader's Acad. Title	Assist Prof.	Module Leader's Qualification	Ph.D.
Module Tutor	Waseem Yousif Mohammed	e-mail	waseemyousif@uodiyala.edu.iq
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	1/9/2025	Version Number	2

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Biochemistry I	Semester	3
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The module is designed to provide students with details of the metabolism of major classes of biomolecules. This will encourage an appreciation of the diversity and interconnection of metabolic pathways, and stimulate an understanding of the applicability of metabolism in a broad range of biological contexts.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Explain the biosynthesis and catabolism of various metabolites in cells 2. Describe carbohydrate metabolism, particularly, gluconeogenesis and the pentose phosphate pathway 3. Describe lipid and nucleotide metabolism as well as biosynthesis and catabolism of amino acids 4. Discuss metabolic interrelationships in cells and tissues under various conditions 5. Dissect biosynthetic and catabolic pathways of diverse metabolites and their products in cells 6. Conduct laboratory practicals, collect data, interpret and discuss results
Indicative Contents المحتويات الإرشادية	Carbohydrate metabolism - Gluconeogenesis and the pentose phosphate pathway - The role of enzymes and hormones in the control of metabolisms - Metabolic roles and importance in energy supply and provision of precursors - Lipid metabolism - Function, transport and storage of lipids and other esters - Biosynthesis, degradation, and desaturation - Acetyl-CoA carboxylase and

Semester Four

	fatty acid synthesis - Purine and pyrimidine nucleotide metabolism - Nitrogen acquisition and amino acid metabolism - Biosynthesis and catabolism of amino acids and the regulation of pathways - Metabolic interrelationships
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Lessons of all units will be offered in an interactive lecture where student participation is mandatory either by forming small group discussion in class, exchange ideas and question one another. Where applicable students will be assigned problems to solve and encouraged to assess one another. Learning material will be supplied to students in class or uploaded on Blackboard learning management system. Students will also be regularly referred to relevant section of the prescribed text book. Most of the tutorial work will be done as self-study or with the assistance of a tutor. The teacher will facilitate lectures and laboratory experiment sessions with the assistance of a tutor or laboratory demonstrator. Assessment will be both formative and summative. Formative assessment refers to assessment whose purpose is to monitor student learning but will not be graded. Summative assessment refers to assessment given to students for grading such as theory tests, practical tests and examination.
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب لـ 15 اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	77	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	65	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	4.3
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	143		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المناهج الأسبوعي النظري

	Material Covered
Week 1	Carbohydrate metabolism (digestion, absorption)
Week 2	Anaerobic oxidation, calculation energy
Week 3	Lipid metabolism (digestion) and absorption acids bile salts,
Week 4	The Fatty Acid Oxidation, Energetics of β -oxidation
Week 5	oxidation and energy calculation
Week 6	Protein metabolism, osmotic balance
Week 7	Digestion and absorption Proteins: transformations

Semester Four

Week 8	EXAM
Week 9	The chemistry of acids the amino in living tissues
Week 10	Products Final, (urea) to disintegrate amino acids in living tissue
Week 11-12	Hormones
Week 13	Sugar biosynthesis, Photosynthesis and synthesis disaccharides
Week 14	Sugar biosynthesis, Photosynthesis and synthesis disaccharide
Week 15	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Amino acids- Solubility test
Week 2	Ninhydrin Test
Week 3	Xanthoproteic test
Week 4	Mellon test
Week 5	Sakaguchi test
Week 6	Hopkins-Colé test
Week 7	EXAM
Week 8	Proteins -Biuret test
Week 9	Denaturation
Week 10	Precipitation using concentrated acid
Week 11	Precipitation by salts of heavy metals
Week 12	Precipitation by alkaline reagents
Week 13	Precipitation using organic solvents
Week 14	Precipitation using neutral salts
Week 15	EXAM

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	L Nelson, D., & Michael M, C. (2021). Lehninger Principles of Biochemistry 8th Edition.	Yes
Recommended Texts	Rodwell, V. W., Bender, D., & Botham, K. M. (2018). Harper's illustrated biochemistry. McGraw-Hill.	No
Websites	https://ocw.mit.edu/courses/5-111-principles-of-chemical-science-fall-2008/ https://ocw.mit.edu/courses/7-012-introduction-to-biology-fall-2004/download/	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Microbiology II		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	Bio-2415		
ECTS Credits	7		
SWL (hr/sem)	142		
Module Level	2	Semester of Delivery	
Administering Department	Dept. of Biology	College	College of Science
Module Leader	Zainab Mohammed Nsaif	e-mail	dr.zainab@uodiyala.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	PhD
Module Tutor	Zainab Mohammed Nsaif	e-mail	dr.zainab@uodiyala.edu.iq
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	1/9/2025	Version Number	2

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Microbiology I	Semester	3
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Clinical microbiology deals with microorganisms such as pathogenic bacteria, viruses, fungi and parasites which are medically important and cause human diseases. Generally, microorganisms can cause a tremendous change on our planet and our life, there is a scientific speech says if “there is no microorganism on our earth there is no life on our planet” otherwise is also true because there are some dangerous and infectious microorganism which cause a dangerous airborne, foodborne and waterborne diseases that some of them are fatal and threaten human life. Evolution in the field of Clinical microbiology and exactly about identification of pathogenic microorganisms and the methods of chemotherapy and prophylaxes has saved the life of millions of peoples on our planet. Students will acquire a broad understanding of the basics of microbiology laboratories in terms of sterilization methods and the rules that must be adhered to when dealing with the tools and equipment used, in addition to using the laboratory techniques necessary to isolate these organisms and identify their shapes and characteristics. The student will also learn the techniques necessary to identify the types of these organisms and their groups, methods of counting, isolating and staining them.

	Course Objective: 1. To understand the basic principles of Clinical Microbiology. 2. To provide the student with the basic knowledge of microorganisms in general 3. To study the main characteristics of microbes of medical importance and their identification. 4. To teach aseptic techniques. 5. To provide an understanding of antimicrobial agents and infectious diseases. 6. To teach the basic immunological principles and methods for the study of immunological disorders.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	At the end of this module students should be able to: ▪ Develop advanced academic knowledge about the concepts and principles of Medical Microbiology. ▪ Cover the importance of Microbiology and the history background of this subject. ▪ Detail knowledge about the Medical Microbiology and its applications. ▪ Having knowledge about the up-to-date advancing and development in this field of subject ▪ They could be familiar with the modest instruments in the medical labs like PCR and ELISA. ▪ In addition to learning practically the technique of examining, using, how to collect the different type of specimens and how to prepare it for examinations and be familiar with the results and writing reports. ▪ Recognition the methods of sterilization in the laboratory. ▪ Tools and equipment used in the laboratory. ▪ Staining methods and types of dyes used to identify the types of microorganisms. ▪ Methods of counting bacteria. ▪ Techniques for the process of culturing on plates.
Indicative Contents المحتويات الإرشادية	The module will include: Class attendance is regularly 85-90% of lectures each week 5 minutes before the lecture is a must. The students should also submit homework and assignments, accomplish extra classroom requirements such as preparing scientific reports, presentation and seminars and also be ready for performing quizzes, mid-term and final exams, participate in the laboratory works (practical labs) in order to pass successfully. Basics of working in the laboratory. Methods of dealing with tools and equipment in the laboratory.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Every student or small grouping students must prepare a report about a subject regarding clinical microbiology. Each report must include the following information: the logo of university or the Institute, the name of college or department, student's name, the title of the report, short description and brief introduction about the subject, aims of the report, short review literature, prospects and overviews and finally the references. Each student or small group is present his/her/there reports as a seminar (presentation) to confirm their capability to speak about a scientific subject in front of gathering in a teaching hall. All lessons held in the laboratory will be practical, with the participation of all students, who will be distributed into small groups to obtain the required results and encourage the spirit of competition among students and
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Semester Four

	encouragement among groups to complete the experiment in the required manner.
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Student Workload (SWL) الحمل الدراسي للطلاب محسوب لـ 15 اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	77	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	65	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	4.3
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	145		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Systemic Classification of Microorganisms
Week 2	Systematic Classification of Bacteria
Week 3	Systematic Classification of Fungi
Week 4	Systematic Classification of Algae
Week 5	First Exam
Week 6	Systematic Classification of Protozoa
Week 7	Microbes and Biogeochemical Cycling of Elements
Week 8	Introduction into Environmental Microbiology
Week 9	Introduction to Industrial Microbiology
Week 10	Introduction to medical microbiology and Immunity
Week 11	Introduction to immunology
Week 12	Review
Week 13	Second Exam

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

Semester Four

Week 1	Lab1 An introduction to microbiology, aseptic technique and safety
Week 2	Lab2 Tools and Equipment used in Microbiology Lab.
Week 3	Lab3 Culture Media
Week 4	Lab4 Bacterial Staining
Week 5	Lab5 Type of the Stains/ Differential stain
Week 6	Lab6 Selective stain
Week 7	Lab7 Antibiotics
Week 8	Mid exam
Week 9	Lab8 Bacterial Count
Week 10	Lab9 Turbidimetry Determinations:
Week 11	Lab10 Pour Plate Method
Week 12	Lab11 Bacterial Culture Techniques
Week 13	Lab12 Colony morphology
Week 14	Lab13 Yeast and molds
Week 15	Final exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Dubey, R. C., & Maheshwari, D. K. (2023). A textbook of microbiology. S. Chand Publishing.	Yes
Recommended Texts	Green, L. H., & Goldman, E. (Eds.). (2021). Practical handbook of microbiology. CRC press. Parija, S. C. (2023). Textbook of microbiology and immunology. Berlin, Heidelberg, Germany: Springer.	Yes
Websites	https://microbiologyinfo.com/ https://microbe.net/resources/microbiology-web-resources/	

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

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

**Ministry of Higher Education and Scientific Research
University of Diyala
College of Science
Department of Biology**



**MODULE DESCRIPTION FORM
FIRST CYCLE
LEVEL THREE**

**وصف المقرر لمسار بولونيا
المستوى الثالث
الدورة الاولى**

2025/2026

Semester Five

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Cell Biology		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	Bio-3511		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	3	Semester of Delivery	
Administering Department	Dept. of Biology	College	College of Science
Module Leader	Dr. Ibrahim Hadi Mohammed	e-mail	dr.ibrahimhadi@uodiyala.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Ibrahim Hadi Mohammed	e-mail	dr.ibrahimhadi@uodiyala.edu.iq
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date		Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	- Understand the fundamental structure and function of cells, the basic units of life in all organisms. - Differentiate between prokaryotic and eukaryotic cells, as well as between plant and animal cells. - Explore the structure and function of major cellular organelles, including the nucleus, mitochondria, endoplasmic reticulum, Golgi apparatus, and cytoskeleton. - Gain knowledge of the chemical composition of cells, including biomolecules like proteins, lipids, carbohydrates.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of this course, students will be able to: - Describe the structure and function of cellular components, including membranes, organelles, and the cytoskeleton. - Differentiate between types of cells, such as prokaryotic vs. eukaryotic, and plant vs. animal cells. - Explain the mechanisms of membrane transport, including diffusion, osmosis, and active transport.
Indicative Contents المحتويات الإرشادية	Introduction Cell biology
Learning and Teaching Strategies	
استراتيجيات التعلم والتعليم	

Strategies	1. Lessons of all units will be offered in an interaction lecture where student participation is mandatory either by forming small discussion groups in class, or by exchanging ideas and question one another. 2. Where applicable students will be assigned problems to solve and encouraged to assess one another. 3. Learning material will be supplied to students in class or uploaded on Blackboard learning management system. 4. Students will also be regularly referred to relevant section of the prescribed text book. 5. Most of the tutorial work will be done as self-study or with the assistance of a tutor. 6. The teacher will facilitate lectures and laboratory experiment sessions with the assistance of a tutor or laboratory demonstrator. Assessment will be both formative and summative. Formative assessment refers to assessment whose purpose is to monitor student learning but will not be graded. Summative assessment refers to assessment given to students for grading such as theory tests, practical tests and examination.
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Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ 15 اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to cell biology
Week 2	Techniques in cell biology
Week 3	Cell Membranes
Week 4	Cell Organelles and Structures
Week 5	Golgi apparatus , Endoplasmic reticulum , Mitochondria, chloroplasts
Week 6	Lysosome , peroxisome, Cytoskeleton
Week 7	Nucleus , Chromosome
Week 8	Exam
Week 9	Cell Signaling

Week 10	Cell Division
Week 11	Cell Cycle
Week 12	Apoptosis , programmed Cell death
Week 13	Cell communication
Week 14	Genetic diseases
Week 15	Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to laboratory techniques
Week 2	Lab 2: Light microscopy and electron
Week 3	Lab 3: Cell fractionation
Week 4	Lab 4: Cell centrifugation
Week 5	Lab 5: Cell culture techniques
Week 6	Lab 6: Cell staining
Week 7	Lab 7: Observation of Cell Types
Week 8	Lab 8: Exam
Week 9	Lab 9: Cell Membrane Permeability
Week 10	Lab 10: Mitosis
Week 11	Lab 11: Cell Counting
Week 12	Lab 12: Cell Culture
Week 13	Lab 13: Osmosis and Diffusion
Week 14	Lab 14: Apoptosis Assays
Week 15	Lab 15: Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Alberts, B., Heald, R., Johnson, A., Morgan, D., Raff, M., Roberts, K., & Walter, P. (2022). Molecular biology of the cell: seventh international student edition with registration card. WW Norton & Company.	No
Recommended Texts	Lodish, H. F., Berk, A., Kaiser, C., Krieger, M., Bretscher, A., Ploegh, H. L., ... & Amon, A. (2021). Molecular cell biology (Vol. 1). New York: WH Freeman.	Yes
Websites	https://www.nature.com/scitable/topic/cell-biology-13906536/ https://rupress.org/jcb	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors

	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Ecology		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	Bio-3512		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	3	Semester of Delivery	
Administering Department	Dept. of Biology	College	College of Science
Module Leader	Dr.Munther Hamza Rathi	e-mail	Prof.dr.rathi@uodiyala.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr.Munther Hamza Rathi	e-mail	Prof.dr.rathi@uodiyala.edu.iq
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date		Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	By the end of this course, students will be able to: 1. Understand core ecological principles - Explain the structure and function of ecosystems, biomes, and major biogeochemical cycles. - Describe the interactions between living organisms and their physical environment. 2. Analyze environmental issues - Identify and evaluate local, regional, and global environmental problems. - Assess human impacts on air, water, soil, and biodiversity. 3. Apply scientific methods to environmental studies - Design and conduct laboratory and field experiments related to environmental factors. - Collect, analyze, and interpret environmental data using appropriate tools and statistical methods. 4. Evaluate sustainability concepts - Explain the principles of sustainable resource use and conservation. - Discuss strategies for balancing environmental, economic, and social needs.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of this course, students will be able to: 1. Describe the fundamental concepts of ecology, including ecosystem structure, energy flow, and biogeochemical cycles. 2. Identify major environmental problems such as pollution, deforestation, climate change, and biodiversity loss. 3. Explain the impact of human activities on natural resources including air, water, and soil.

	4. Design and conduct simple experiments to investigate environmental factors and analyze data using basic statistical tools.
Indicative Contents المحتويات الإرشادية	1. Introduction to Environmental Science • Definition, scope, and importance • Components of the environment (biotic and abiotic factors) • Levels of organization: individual, population, community, ecosystem, biosphere 2. Ecosystems and Ecological Principles • Structure and function of ecosystems • Energy flow and food chains/webs • Biogeochemical cycles (carbon, nitrogen, phosphorus, water cycles) • Ecological succession 3. Biodiversity and Conservation • Importance of biodiversity • Threats to biodiversity: habitat loss, pollution, invasive species • Conservation strategies and protected areas 4. Population Ecology and Dynamics • Population growth models (exponential, logistic) • Carrying capacity and limiting factors • Human population growth and impact 5. Environmental Pollution • Types of pollution: air, water, soil, noise, and thermal pollution • Sources and effects of pollutants • Pollution control methods and technologies.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Lessons of all units will be offered in an interaction lecture where student participation is mandatory either by forming small discussion groups in class, or by exchanging ideas and question one another. 2. Where applicable students will be assigned problems to solve and encouraged to assess one another. 3. Learning material will be supplied to students in class or uploaded on Blackboard learning management system. 4. Students will also be regularly referred to relevant section of the prescribed text book. 5. Most of the tutorial work will be done as self-study or with the assistance of a tutor. 6. The teacher will facilitate lectures and laboratory experiment sessions with the assistance of a tutor or laboratory demonstrator. Assessment will be both formative and summative. Formative assessment refers to assessment whose purpose is to monitor student learning but will not be graded. Summative assessment refers to assessment given to students for grading such as theory tests, practical tests and examination.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ 15 اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation تقييم المادة الدراسية				
	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Ecology- Introduction and terms , Branches of Ecology , Levels organization of Ecology Habitat.
Week 2	Basic principles of Ecosystem
Week 3	Energy flow in the ecosystem, Food chain and food web, Ecological pyramids
Week 4	Some Major Ecosystem
Week 5	Biogeochemical cycles : Gaseous cycles
Week 6	Biogeochemical cycles : Sedimentary cycles
Week 7	Exam
Week 8	Primary and secondary productivity
Week 9	Biological interrelationships
Week 10	Limiting factors and tolerance levels : Liebiges law of minimum 1840
Week 11	Limiting factors and tolerance levels : Shelfords law of tolerance 1911
Week 12	Population
Week 13	Biodiversity and its Conservation
Week 14	Environmental organizations
Week 15	Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Temperature measurements
Week 2	Lab 2: Relative humidity
Week 3	Lab 3: Atmospheric pressure
Week 4	Lab 4: Other instruments and devices are used in ecology for different purpose eg. Van Dorn water sampler
Week 5	Lab 5: Turbidity and nephelometer
Week 6	Lab 6: Sampling in Ecology
Week 7	Lab 7: Exam
Week 8	Lab 8: Animal Populations Sampling
Week 9	Lab 9: Soil sampling and textures
Week 10	Lab 10: Measurement of productivity
Week 11	Lab 11: Solar soil sterilization (an environmentally-friendly alternative)
Week 12	Lab 12: Demonstrating Liebig's Law of the Minimum

Week 13	Lab 13: Salt stress on plant germination (NaCl gradient)
Week 14	Lab 14: pH effect on seed germination / alge growth .
Week 15	Lab 15: Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Singh, V. (2025). Textbook of environment and ecology (pp. 217-224). Singapore: Springer.	Yes
Recommended Texts	van Wilgen, B. W. (2025). New ecological textbook for Angola. South African Journal of Science, 120(1/2).	Yes
Websites	https://esa.org/about/what-does-ecology-have-to-do-with-me/ https://www.britannica.com/science/ecology	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية				
Module Title	Histology		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	Bio-3513			
ECTS Credits	4			
SWL (hr/sem)	100			
Module Level	3	Semester of Delivery		
Administering Department		Dept. of Biology	College	College of Science

Module Leader	Dr.Anwar Abdulameer Mohammad	e-mail	anwarabdulameer@uodiyala.edu.iq
Module Leader's Acad. Title	Assistant professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr.Anwar Abdulameer Mohammad	e-mail	anwarabdulameer@uodiyala.edu.iq
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date		Version Number	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Introduction to histology , primary tissues their description and features
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Students have to know characteristics of each tissue in different organs , to understand functions of each system or organ in the human body .
Indicative Contents المحتويات الإرشادية	1. Introduction to Histology • Definition, scope, and importance of histology • Basic microscopy techniques and preparation of tissue samples 2.Epithelial Tissue • Classification of epithelial tissues • Structure, function, and locations • Specializations (cilia, microvilli, glands) 3. Connective Tissue • Types of connective tissue: loose, dense, cartilage, bone, blood • Components of connective tissue: cells, fibers, matrix • Functions and examples 4. Muscle Tissue • Types: skeletal, cardiac, and smooth muscle • Structure and function of each muscle type • Muscle contraction basics 5. Nervous Tissue • Neurons: structure and function • Neuroglia cells • Synapses and nerve impulses 6. Specialized Tissues and Organs • Histology of skin and its derivatives • Histology of blood and lymphatic tissue • Histology of endocrine and exocrine glands.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Lessons of all units will be offered in an interaction lecture where student participation is mandatory either by forming small discussion groups in class, or by exchanging ideas and question one another. 2. Where applicable students will be assigned problems to solve and encouraged to assess one another. 3. Learning material will be supplied to students in class or uploaded on Blackboard learning management system.

	4. Students will also be regularly referred to relevant section of the prescribed text book. 5. Most of the tutorial work will be done as self-study or with the assistance of a tutor. 6. The teacher will facilitate lectures and laboratory experiment sessions with the assistance of a tutor or laboratory demonstrator. Assessment will be both formative and summative. Formative assessment refers to assessment whose purpose is to monitor student learning but will not be graded. Summative assessment refers to assessment given to students for grading such as theory tests, practical tests and examination.
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Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ 15 اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to histology and epithelial tissue ,
Week 2	Glandular epithelial tissue , classification of glands and their description and locations
Week 3	Connective tissue , and essential elements of connective tissue
Week 4	Classification of connective tissue , proper connective tissue , their features and locations
Week 5	skeletal connective tissue , cartilage , types of cartilages , locations in addition to cartilage development
Week 6	Skeletal connective tissue , Bone , features of bones , matrix
Week 7	Hemopoetic tissue , maturation of erythrocytes and leukocytes
Week 8	Exam
Week 9	Muscular tissue , types of muscle , features of each type of muscle
Week 10	Nerve tissue , features of nerves , ,classification of neurons and fibers in addition to glial cells
Week 11	Circulatory system , divisions of the system , features of arteries and veins ...
Week 12	Lymphatic system , features of lymphatic vessel , thymus gland and spleen in addition to tonsils
Week 13	Integumentary system , epidermis and dermis
Week 14	Hair layers and nail

Week 15	Exam
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Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Epithelial tissue , types of epithelial (simple and stratified)
Week 2	Lab 2: Glandular epithelial , classification of glands their features
Week 3	Lab 3: Connective tissue , proper (loose connective)
Week 4	Lab 4: cartilage types , hyaline , elastic and white fiber cartilage
Week 5	Lab 5: Bone , organization of bone lamellae
Week 6	Lab 6: Exam
Week 7	Lab 7: Histology of bone marrow , red bone marrow and yellow
Week 8	Lab 8: histology of skeletal muscle , smooth and cardiac muscle
Week 9	Lab 9: features of nerve tissue , types of glail and nerve fibers
Week 10	Lab 10: layers of arteries , veins and pericardium
Week 11	Lab 11: skin histology , epidermis and dermis , deat glands and sebaceous glands
Week 12	Lab 12: layers of hair
Week 13	Lab 13: lymphatic organs lymph nodes , spleen and tonsils
Week 14	Lab 14: digestive system histology oral cavity and salivary gland
Week 15	Lab 15: Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	O'Dowd, G., Bell, S., & Wright, S. (2023). Wheater's Functional Histology, E-Book: A Text and Colour Atlas. Elsevier Health Sciences.	Yes
Recommended Texts	Neumann, P. E., & Neumann, E. E. (2021). General histological woes: Definition and classification of tissues. Clinical Anatomy, 34(5), 794-801.	Yes
Websites	https://www.ncbi.nlm.nih.gov/books/NBK557663/ https://www.open.edu/openlearn/mod/oucontent/view.php?id=65372&section=1	

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية				
Module Title	Mycology		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	Bio-3514			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	3	Semester of Delivery		5
Administering Department	Dept. of Biology		College	College of Science
Module Leader	Dr.Anaam Fuad Hussain		e-mail	anaamfuad@uodiyala.edu.iq
Module Leader's Acad. Title	Professor		Module Leader's Qualification	Ph.D.
Module Tutor	Dr.Anaam Fuad Hussain		e-mail	anaamfuad@uodiyala.edu.iq
Peer Reviewer Name			e-mail	
Scientific Committee Approval Date			Version Number	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Introducing the student to fungi in terms of the history of interest in them, their characteristics, methods of diagnosis and preservation, their importance to humans, and the transformations they carry out in mineral and organic materials, as they are organisms with enzymatic activity, and the role of these organisms in maintaining the vital environmental balance. 2. Introducing the student to the classical classification of fungi and the technical developments taking place in this science, such as chemical and molecular methods. 3. Introducing the student to medical fungi, how to treat and prevent them, as well as mycotoxigenic fungi, those used in industry, and biological resistance.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of this course, students will be able to: 1. Understand the basic biology and classification of fungi, including their morphology, physiology, and life cycles. 2. Identify and describe the major groups of fungi, including yeasts, molds, and mushrooms, using microscopic and macroscopic characteristics.
Indicative Contents المحتويات الإرشادية	1. Introduction to Mycology • Definition and scope of mycology • History and significance of fungi 2. Fungal Morphology and Structure • General characteristics of fungi • Hyphae, mycelium, spores, and reproductive structures 3. Fungal Classification and Taxonomy • Major fungal groups (Zygomycetes, Ascomycetes, Basidiomycetes, Deuteromycetes) • Criteria for classification 4. Fungal Physiology and Nutrition • Growth requirements • Metabolic pathways • Environmental factors affecting fungi 5. Fungal Life Cycles and Reproduction • Sexual and asexual reproduction • Spore formation and dispersal mechanisms 6. Ecology and Economic Importance of Fungi • Role in decomposition and nutrient cycling • Symbiotic relationships (mycorrhizae, lichens) • Industrial and pharmaceutical applications 7. Pathogenic Fungi • Fungal diseases in humans, animals, and plants • Mechanisms of pathogenicity and host response 8. Laboratory Techniques in Mycology • Isolation and cultivation methods • Identification techniques (microscopy, staining, biochemical tests)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Lessons of all units will be offered in an interaction lecture where student participation is mandatory either by forming small discussion groups in class, or by exchanging ideas and question one another. 2. Where applicable students will be assigned problems to solve and encouraged to assess one another. 3. Learning material will be supplied to students in class or uploaded on Blackboard learning management system. 4. Students will also be regularly referred to relevant section of the prescribed text book.

	5. Most of the tutorial work will be done as self-study or with the assistance of a tutor. 6. The teacher will facilitate lectures and laboratory experiment sessions with the assistance of a tutor or laboratory demonstrator. Assessment will be both formative and summative. Formative assessment refers to assessment whose purpose is to monitor student learning but will not be graded. Summative assessment refers to assessment given to students for grading such as theory tests, practical tests and examination.
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Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ 15 اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Mycology definition History of fungi, general characteristics of fungi and relationship among fungi and other organisms
Week 2	Principles of living fungi: Living mode of fungi, Nutrition
Week 3	Morphology of fungi: molds and Yeasts
Week 4	Fungal cell Structure and Function
Week 5	Reproduction of fungi
Week 6	Exam
Week 7	Taxonomy of fungi, Kingdom1: protozoa
Week 8	Kingdom II: Straminipila
Week 9	Kingdom III: Fungi , Phylum1: Chytridiomycota, Phylum2: Zygomycota
Week 10	Phylum3: Ascomycota , Class1: Archiascomycetes
Week 11	Phylum3: Ascomycota , Class2: Hemiascomycetes
Week 12	Phylum3: Ascomycota Class3: Plectoascomycetes, Class4: Hymenoascomycetes, Class5: Loculoascomycetes
Week 13	Phylum4: Basidiomycota

Week 14	Phylum5: Anamorphic Fungi
Week 15	Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Laboratory Safety Manual
Week 2	Lab 2:Isolation of Fungi from different sources
Week 3	Lab 3:Study of fungal Morphology Macroscopic and microscopic study
Week 4	Lab4: Study the effects of some physiological parameters on fungal (molds) growth
Week 5	Lab5: Preservation in Fungi
Week 6	Lab 6: Classification of fungi, Kingdom I: Protozoa, Class1: Myxomycetes
Week 7	Lab 7: Kingdom II: Straminipila, Phylum: Oomycota
Week 8	Lab 8: Kingdom III: Fungi , Phylum1: Chytridiomycota
Week 9	Exam
Week 10	Lab 9:Phylum2: Zygomycota
Week 11	Lab10: Phylum3: Ascomycota, Class 1: Archiascomycetes, Class 2: Hemiascomycetes Class 3:
Week 12	Lab 11 Phylum3: Ascomycota, Class 4: Hymenoascomycetes (Pyrenomycetes), Class5: Loculoascomycetes
Week 13	Lab 12: Phylum4: Basidiomycota
Week 14	Lab 13: Phylum5:Anamorphic fungi
Week 15	Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Introductory mycology 3 rd ed. (1996)Editor :Alexopoulos and Mims. Introduction to fungi 3 rd . ed.(2007) Editor: Webster and Weber. Parija, S. C., & Rudramurthy, S. M. (Eds.). (2025). Textbook of Fungal Zoonoses and Sapronoses. Springer.	Yes
Recommended Texts	Shanahan, K. (2025). OVERVIEW OF FUNGAL DISEASE AND MEDICAL MYCOLOGY.	Yes
Websites	https://imafungus.pensoft.net/ https://www.merriam-webster.com/dictionary/mycology	

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Plant physiology		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	Bio-3515		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	3	Semester of Delivery	
Administering Department	Dept. of Biology	College	College of Science
Module Leader	Dr.Dina Abdulsalam Saad	e-mail	dinaabdulsalam@uodiyala.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Dr.Dina Abdulsalam Saad	e-mail	dinaabdulsalam@uodiyala.edu.iq
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date		Version Number	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	1. Study the functions of plant organs and identify their general characteristics. 2. Study the mechanisms of plant physiological functions, such as photosynthesis and respiration. 3. Learn the chemical and physical properties of water and the mechanisms of water and salt absorption in plants. 4. Learn about the types of plant growth regulators.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Address the most important mechanisms of water and salt absorption in plants. 2. Identify the most important theories of plant sap ascent. 3. Learn the most important physiological processes in plants, namely photosynthesis and respiration. 4. The student will learn about the interactions of light and darkness in different plants. 5. Address the most important plant growth
Indicative Contents المحتويات الإرشادية	1. Introduction to Plant Physiology • Definition, scope, and importance • Overview of plant cell structure and function 2. Water Relations in Plants

	- Water uptake, transport, and transpiration - Osmosis, diffusion, and water potential - Mechanisms of water movement in plants 3. Mineral Nutrition - Essential nutrients and their roles - Mechanisms of nutrient uptake and transport - Nutrient deficiencies and toxicity symptoms 4. Photosynthesis - Structure and function of chloroplasts - Light and dark reactions (Calvin cycle) - Factors affecting photosynthesis efficiency 5. Respiration in Plants - Aerobic and anaerobic respiration - Glycolysis, Krebs cycle, and electron transport chain 6. Plant Growth and Development - Hormones and growth regulators (auxins, gibberellins, cytokinins, ethylene, abscisic acid) - Seed germination and dormancy - Photoperiodism and flowering.
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	- Lessons of all units will be offered in an interaction lecture where student participation is mandatory either by forming small discussion groups in class, or by exchanging ideas and question one another. - Where applicable students will be assigned problems to solve and encouraged to assess one another. - Learning material will be supplied to students in class or uploaded on Blackboard learning management system. - Students will also be regularly referred to relevant section of the prescribed text book. - Most of the tutorial work will be done as self-study or with the assistance of a tutor. - The teacher will facilitate lectures and laboratory experiment sessions with the assistance of a tutor or laboratory demonstrator. Assessment will be both formative and summative. Formative assessment refers to assessment whose purpose is to monitor student learning but will not be graded. Summative assessment refers to assessment given to students for grading such as theory tests, practical tests and examination.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ 15 اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Water relationships
Week 2	diffusion and osmosis
Week 3	Plasmolysis
Week 4	Absorption of water
Week 5	Ascent of sap
Week 6	Absorption of mineral salts
Week 7	Active and passive transport
Week 8	Exam
Week 9	photosynthesis
Week 10	Dark reaction
Week 11	Respiration
Week 12	Krips cycle
Week 13	Plant growth regulators
Week 14	Cytokinins
Week 15	Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Solution and their types
Week 2	Lab 2: Solution concentration
Week 3	Lab 3: Diffusion
Week 4	Lab 4: Osmosis
Week 5	Lab 5: Plasmolysis and Deplasmolysis
Week 6	Lab 6: Transport elements in plants
Week 7	Lab 7: Exam
Week 8	Lab 8: Photosynthesis
Week 9	Lab 9: Transpiration
Week 10	Lab 10: Separation of plant pigments
Week 11	Lab 11: Seeds dormancy
Week 12	Lab 12: Thin layer chromatography (TLC)
Week 13	Lab 13: Respiration
Week 14	Lab 14: The plant hormones
Week 15	Lab 15: Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Bhatla, S. C., & Lal, M. A. (2023). Plant physiology, development and metabolism. Springer Nature.	Yes
Recommended Texts	Pratap, M. (2025). A Textbook of Plant Physiology. Academic Guru Publishing House.	Yes
Websites	https://www.sciencedirect.com/journal/journal-of-plant-physiology https://bio.libretexts.org/Bookshelves/Botany/Botany_(Ha_Morrow_and_Algiers)/04%3A_Plant_Physiology_and_Regulation	

Grading Scheme

مخطط الدرجات

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

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information		
معلومات المادة الدراسية		
Module Title	Immunology	Module Delivery
Module Type	Core	☒ Theory

Module Code	Bio-3516		☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar		
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level		3	Semester of Delivery		5
Administering Department		Dept. of Biology	College	College of Science	
Module Leader	Dr.Ibtihal Hameed Mohsin		e-mail	ibtihalhameed@uodiyala.edu.iq	
Module Leader's Acad. Title		Assistant professor	Module Leader's Qualification		Ph.D.
Module Tutor	Dr.Ibtihal Hameed Mohsin		e-mail	ibtihalhameed@uodiyala.edu.iq	
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date			Version Number		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Understanding the history of immunology: Studying the origins of this science, its historical milestones, and the key scientists and discoveries that contributed to its development. 2. Exploring the fields and development of immunology: Reviewing the medical and research applications of immunology and its recent advancements. 3. Types of immunity and determining factors: Understanding innate and acquired immunity, as well as the genetic and environmental factors influencing immune responses. 4. Immune cells and their mechanisms of action: Studying the different types of immune cells (e.g., T cells, B cells, macrophages) and how they work together to combat pathogens. 5. Lymphoid organs: Identifying the primary and secondary lymphoid organs and their roles in the production and activation of immune cells. 6. Types of immune responses: Differentiating between humoral and cell-mediated responses and understanding their mechanisms.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	A: Cognitive Objectives: 1. Knowledge (Level 1): Develop students' knowledge and their ability to recall learned information. 2. Comprehension (Level 2): Improve the level of understanding and the ability to interpret concepts. 3. Application (Level 3): Develop practical skills and the ability to apply learned knowledge. 4. Analysis (Level 4): Enhance the ability to break down information into components and examine relationships. 5. Synthesis (Level 5): Develop the ability to integrate and combine ideas to form new concepts. 6. Evaluation (Level 6): Enable students to make judgments about the value and quality of material. B :Skills Objectives (Specific to the Course): 1.Improve students' observation skills. 2.Teach students imitation and modeling skills. 3.Train students in experimental techniques and methods.
Indicative Contents المحتويات الإرشادية	1. Introduction to Immunology - Definition, scope, and historical perspective - Overview of the immune system components 2. Innate Immunity

	- Physical and chemical barriers - Cells involved in innate immunity (macrophages, neutrophils, NK cells) - Inflammatory response and complement system 3. Adaptive Immunity - Humoral and cell-mediated immunity - B lymphocytes: development, activation, and antibody production - T lymphocytes: types, activation, and functions 4. Antigens and Antibodies - Structure and classification of antigens - Immunoglobulin classes and structure - Antigen-antibody interactions 5. Immune Response Regulation - Cytokines and their roles - Mechanisms of immune tolerance and autoimmunity
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	- Lessons of all units will be offered in an interaction lecture where student participation is mandatory either by forming small discussion groups in class, or by exchanging ideas and question one another. - Where applicable students will be assigned problems to solve and encouraged to assess one another. - Learning material will be supplied to students in class or uploaded on Blackboard learning management system. - Students will also be regularly referred to relevant section of the prescribed text book. - Most of the tutorial work will be done as self-study or with the assistance of a tutor. - The teacher will facilitate lectures and laboratory experiment sessions with the assistance of a tutor or laboratory demonstrator. Assessment will be both formative and summative. Formative assessment refers to assessment whose purpose is to monitor student learning but will not be graded. Summative assessment refers to assessment given to students for grading such as theory tests, practical tests and examination.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ 15 اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

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

Total assessment	100% (100 Marks)		
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Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction of immunity
Week 2	Inflammation
Week 3	The Complement System
Week 4	Antibodies & Antigen
Week 5	Adaptive immunity (specific immune defense)
Week 6	Cellular Immunity Response Process
Week 7	Disorders Associated with the Immune System
Week 8	Hypersensitivity
Week 9	Immunological tolerance
Week 10	Autoimmune diseases
Week 11	Reactions to Transplantation
Week 12	Cytokines
Week 13	The role of lymphocytes in adapative immunity
Week 14	phagocytosis
Week 15	Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Clinical Samples (Plasma and Serum)
Week 2	Lab 2: Bactericidal Effect of Normal Serum
Week 3	Lab 3: Immunogens, Antigens, Antibodies and Vaccines
Week 4	Lab 4: Antigen-Antibody Reaction (Serological Tests)
Week 5	Lab 5: Blood Grouping (ABO group)
Week 6	Lab 6: Rose Bengal Test (RBT) Introduction
Week 7	Lab 7: Widal Test
Week 8	Lab 8: C-reactive-protein(CRP)
Week 9	Lab 9: pregnancy test
Week 10	Lab 10: Rheumatoid Factor (RF) Test
Week 11	Lab 11: AOS test
Week 12	Lab 12: ELASA techniques
Week 13	Lab 13: Complete Blood Count with Differential (CBC with Diff)
Week 14	Lab 14: Allergy Testing: Specific IgE for allergens
Week 15	Lab 15: Exam

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

Required Texts	Chin-Hong, P., Joyce, E. A., Karandikar, M., Matloubian, M., Rubio, L. A., Schwartz, B. S., & Levinson, W. E. (2025). Levinson's Review of Medical Microbiology and Immunology: A Guide to Clinical Infectious Disease. McGraw Hill Professional.	Yes
Recommended Texts	Parija, S. C. (2023). Textbook of microbiology and immunology (Vol. 1579). Berlin, Heidelberg, Germany: Springer.	Yes
Websites	https://onlinelibrary.wiley.com/journal/15214141 https://ejimmunology.org/	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
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Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Parasitology		Module Delivery	
Module Type	Elective		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	Bio-3517			
ECTS Credits	4			
SWL (hr/sem)	100			
Module Level	3	Semester of Delivery		
Administering Department	Dept. of Biology	College	College of Science	
Module Leader	Dr.Asraa Dawod Farhan	e-mail	Asraa@uodiyala.edu.iq	
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.	
Module Tutor	Dr.Asraa Dawod Farhan	e-mail	Asraa@uodiyala.edu.iq	
Peer Reviewer Name		e-mail		
Scientific Committee Approval Date		Version Number	1.0	

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	1. To understand the basic principles of parasitology. 2. Identifying and studying parasites that infect humans and animals in detail 3. 3.Studying aspects of the life of each parasite in terms of external appearance, life cycle, pathological and epidemiological causes, and methods of diagnosis and prevention .For all parasites that cause diseases
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	At the end of this module students should be able to: 1. Student Learning Outcome. 2. By the end of the course, the students are being able to develop advanced academic knowledge about the concepts and principles of parasitology. 3. List the different terms associated with parasitology. 4. Detail knowledge about the parasitology and its applications. 5. Conducting discussions that enable the student to link causes with natural causes. 6. Having knowledge about the up-to-date advancing and development in this field of subject 7. In addition to learning practically the technique of examining, using, how to collect the different type of specimens and how to prepare it for examinations and be familiar with the results and writing reports. 8. Define the relationships between the parasite and the host. 9. 9. Identify the most important phylums and species that infect humans and animals. 10. 10.Discuss the different characteristics of parasites.
Indicative Contents المحتويات الإرشادية	Emotional and value goals 1.Enable students to cooperate with each other in solving practical assignments. 2.Enabling students to focus on the topic of the lesson and harmony and interaction with it. 3.Enabling students to organize the information and data they receive during the lesson. 4.Enabling the students to recreate their way of thinking towards living beings and appreciating the greatness of the Almighty Creator.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	1. Lessons of all units will be offered in an interaction lecture where student participation is mandatory either by forming small discussion groups in class, or b exchanging ideas and question one another. 2. Where applicable students will be assigned problems to solve and encouraged to assess one another. 3. Learning material will be supplied to students in class or uploaded on Blackboard learning management system. 4. Students will also be regularly referred to relevant section of the prescribed text book. 5. Most of the tutorial work will be done as self-study or with the assistance of a tutor. 6. The teacher will facilitate lectures and laboratory experiment sessions with the assistance of a tutor or laboratory demonstrator. Assessment will be both formative and summative. Formative assessment refers to assessment whose purpose is to monitor student learning but will not be graded. Summative assessment refers to assessment given to students for grading such as theory tests, practical tests and examination.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ 15 اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	General introduction, history of science Parasites and public relations among animals
Week 2	Parasitism features, types Parasitism, types parasites, and hosts
Week 3	Protozoa and Protozoan Diseases and Life cycle
Week 4	Complementing the genera belonging to the phylum Protozoa
Week 5	Tissue and Blood flagellates (Leishmania spp.)
Week 6	Flagellate: Family Trypanosomatidae, Genus Trypanosoma (African trypanosomiasis / African sleeping
Week 7	SubPhylum: Ciliophora
Week 8	Exam
Week 9	Phylum Sporozoa (blood and tissue sprozoa parasites)(Plasmodium species)
Week 10	Toxoplasma gondii (toxoplasmosis)
Week 11	Phylum :Platyhelminthes
Week 12	Heterophyes heterophyes (heterophysiaisis)
Week 13	Liver and lung trematodes (Flukes)
Week 14	Fasciola hepatica (Sheep liver fluke infection / fascioliasis)
Week 15	Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Protozoa
Week 2	Lab 2: Phylum: Sarcomastigophora.
Week 3	Lab 3: Blood and Tissue flagellates of human (type of Leishmania)
Week 4	Lab 4: Genus (Trypanosoma)

Week 5	Lab 5: Subphylum: Ciliophora
Week 6	Lab 6: Sporozoa(Plasmodium(Toxoplasma gondii)
Week 7	Lab 7: Exam
Week 8	Lab 8: Sporozoa(Plasmodium(Malaria)
Week 9	Lab 9: Flat worms (Platyhelminthes)
Week 10	Lab 10: Trematodes (Flukes)
Week 11	Lab 11: Blood flukes(Schistosoma)
Week 12	Lab 12: Class: Cestoda
Week 13	Lab 13: Taenia saginata (Beef worm),Taenia solium (Pork tape worm)
Week 14	Lab 14: Phylum Nematelminthes:
Week 15	Lab 15: Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Gunn, A., & Pitt, S. J. (2022). Parasitology: an integrated approach. John Wiley & Sons.	Yes
Recommended Texts	Parija, S. C., & Chaudhury, A. (Eds.). (2022). Textbook of parasitic zoonoses. Singapore: Springer.	Yes
Websites	https://www.britannica.com/science/parasitology	

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Genetics		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	Bio-3611		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	3	Semester of Delivery	
Administering Department	Dept. of Biology	College	College of Science
Module Leader	Dr.Ibrahim Hadi Mohammed	e-mail	dr.ibrahimhadi@uodiyala.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr.Ibrahim Hadi Mohammed	e-mail	dr.ibrahimhadi@uodiyala.edu.iq
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date		Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Knowledge of genetic material and Mendel first and second laws and chromosomes
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Knowledge of genetic material and the nature of its function
Indicative Contents المحتويات الإرشادية	- Introduction to Genetics - Definition, scope, and historical milestones - Contributions of Mendel and other pioneers - Cell Structure and Chromosomes - Structure and function of chromosomes - Chromosome number, morphology, and classification - Cell division: mitosis and meiosis - Mendelian Genetics - Laws of inheritance (segregation, independent assortment) - Monohybrid and dihybrid crosses - Test crosses and back crosses - Extensions of Mendelian Genetics - Incomplete dominance, codominance, multiple alleles - Lethal alleles, pleiotropy, and polygenic inheritance - Linkage, Crossing Over, and Genetic Mapping - Concept of linkage and recombination

	Mapping genes on chromosomes
	6. Sex Determination and Sex-Linked Inheritance - Mechanisms of sex determination in different organisms - Sex-linked, sex-influenced, and sex-limited traits
	7. Mutation - Types of mutations: gene, chromosomal, and genomic - Causes and effects of mutations - Mutagenic agents and repair mechanisms
	8. DNA Structure and Function - Discovery and molecular structure of DNA and RNA - DNA replication, transcription, and translation
	9. Regulation of Gene Expression - Prokaryotic and eukaryotic gene regulation - Operon models and epigenetic mechanisms
	10. Genetic Variation and Population Genetics - Sources of genetic variation - Hardy–Weinberg principle and factors affecting equilibrium
	11. Genetics in Practice - Genetic engineering and biotechnology applications - Genetic counseling and ethical considerations
	12. Laboratory and Analytical Techniques in Genetics - Microscopy, karyotyping, and gel electrophoresis - PCR and molecular markers

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	- Lessons of all units will be offered in an interaction lecture where student participation is mandatory either by forming small discussion groups in class, or by exchanging ideas and question one another. - Where applicable students will be assigned problems to solve and encouraged to assess one another. - Learning material will be supplied to students in class or uploaded on Blackboard learning management system. - Students will also be regularly referred to relevant section of the prescribed text book. - Most of the tutorial work will be done as self-study or with the assistance of a tutor. - The teacher will facilitate lectures and laboratory experiment sessions with the assistance of a tutor or laboratory demonstrator. Assessment will be both formative and summative. Formative assessment refers to assessment whose purpose is to monitor student learning but will not be graded. Summative assessment refers to assessment given to students for grading such as theory tests, practical tests and examination.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ 15 اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Genetics
Week 2	Mendel First –Law of Segregation and Law of Independent assortment
Week 3	Sex Limited inheritance and Sex linked inheritance
Week 4	Mitosis and Meiosis
Week 5	Chromosome of Human
Week 6	DNA and RNA
Week 7	Exam
Week 8	Translation
Week 9	Replication and Multiplication
Week 10	Reproductive Cloning
Week 11	Gen Expression
Week 12	Codon
Week 13	Genetic Engineering
Week 14	Genetic diseases
Week 15	Exercises

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to Genetics
Week 2	Lab 2: Exercises Mendel First –Law of Segregation and Law of Independent assortment
Week 3	Lab 3: Exercises Sex Limited inheritance and Sex linked inheritance
Week 4	Lab 4: Study Mitosis and Meiosis in cell
Week 5	Lab 5: Study and selection Chromosome of Human
Week 6	Lab 6: Study purification DNA
Week 7	Lab 7: Study purification RNA
Week 8	Lab 8: Exercises
Week 9	Lab 9: Study purification protein
Week 10	Lab 10: Study wastran blotting
Week 11	Lab 11: Study PCR
Week 12	Lab 12: Electrophoresis

Week 13	Lab 13: plasmid
Week 14	Lab 14: study genetic diseases
Week 15	Lab 15: Exercises

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Bodmer, W. F., & Charlesworth, B. (2025). Mendelian genetics and eugenics. The American Journal of Human Genetics, 112(1), 196-197.	Yes
Recommended Texts	Martens, A. T., & Hilser, V. J. (2025). Chaperone saturation mediates translation and protein folding efficiency. bioRxiv, 2025-06.	Yes
Websites	https://www.britannica.com/science/genetics https://medlineplus.gov/genetics/	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information		
معلومات المادة الدراسية		
Module Title	Environmental Pollution	Module Delivery
Module Type	Core	☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial
Module Code	Bio-3612	
ECTS Credits	5	

SWL (hr/sem)	125		☐ Practical ☐ Seminar
Module Level	3	Semester of Delivery	6
Administering Department	Dept. of Biology	College	College of Science
Module Leader	Dr.Munther Hamza Rathi	e-mail	Prof.dr.rathi@uodiyala.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr.Munther Hamza Rathi	e-mail	Prof.dr.rathi@uodiyala.edu.iq
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date		Version Number	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	A. Knowledge and Understanding: 1. Acquire fundamental knowledge of the sources, types, and causes of environmental pollution. 2. Understand the physical, chemical, and biological impacts of pollution on ecosystems and human health. 3. Recognize international and local regulations, standards, and policies related to environmental protection. B. Intellectual Skills: 1. Analyze the relationships between pollution sources, environmental processes, and their effects. 2. Evaluate scientific data related to pollution measurement and control. 3. Propose solutions and mitigation strategies for different types of environmental pollution. C. Practical and Professional Skills: 1. Apply appropriate techniques to measure and monitor air, water, and soil pollutants. 2. Interpret laboratory and field data to assess pollution levels. 3. Implement basic environmental management practices in real-world scenarios.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of this course, students will be able to: 1. Knowledge and Understanding: • Define the main types and sources of environmental pollution . • Explain the chemical, physical, and biological mechanisms through which pollutants affect ecosystems and human health. • Describe relevant environmental laws, policies, and standards. 2. Intellectual Skills • Analyze environmental problems using scientific data and evidence. • Evaluate pollution control technologies and management strategies. • Propose practical solutions to reduce or prevent pollution. 3. Practical and Professional Skills: • Perform basic laboratory and field measurements for air, water, and soil pollutants. • Interpret pollution monitoring results to assess environmental quality. • Apply safety and environmental protection guidelines during field and lab work.
Indicative Contents المحتويات الإرشادية	Indicative Contents: Environmental Pollution 1. Introduction to Environmental Pollution: definitions, scope, and significance. 2. Types of Pollution: air, water, soil, noise, and radioactive pollution. 3. Sources and Causes of Pollution: natural vs. anthropogenic sources.

	4. Air Pollution: major pollutants, sources, effects, and control methods. 5. Water Pollution: types of pollutants, sources, impact on aquatic life and human health. 6. Soil Pollution: contaminants, causes, and effects on agriculture and ecosystems. 7. Noise Pollution: sources, measurement, and health impacts. 8. Radioactive Pollution: sources, hazards, and safety measures.
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	1. Lessons of all units will be offered in an interaction lecture where student participation is mandatory either by forming small discussion groups in class, or by exchanging ideas and question one another. 2. Where applicable students will be assigned problems to solve and encouraged to assess one another. 3. Learning material will be supplied to students in class or uploaded on Blackboard learning management system. 4. Students will also be regularly referred to relevant section of the prescribed text book. 5. Most of the tutorial work will be done as self-study or with the assistance of a tutor. 6. The teacher will facilitate lectures and laboratory experiment sessions with the assistance of a tutor or laboratory demonstrator. Assessment will be both formative and summative. Formative assessment refers to assessment whose purpose is to monitor student learning but will not be graded. Summative assessment refers to assessment given to students for grading such as theory tests, practical tests and examination.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ 15 اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Definition , Degrees of Ecological pollution , pollutants , Some terms of pollution
Week 2	The effects of environmental pollution on (Human , Animals , Plants , Materials)

Week 3	Air pollution
Week 4	Air pollution
Week 5	Global air pollutants
Week 6	Smog, Plastic pollution
Week 7	Exam
Week 8	Water pollution
Week 9	Thermal pollution
Week 10	Oil pollution
Week 11	Food pollution
Week 12	Soil pollution
Week 13	Nuclear pollution
Week 14	Bioremediation , monitoring pollution , Environmental sanitation
Week 15	Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Dissolved oxygen (DO)
Week 2	Lab 2: Biological Oxygen Demand (BOD)
Week 3	Lab 3: Free CO ₂ in water
Week 4	Lab 4: Measuring Of Salinity
Week 5	Lab 5: Soil pollution
Week 6	Lab 6: Determination of Calcium in Water
Week 7	Lab 7: Determination of Magnesium in Water
Week 8	Lab 8: Exam
Week 9	Lab 9: Air pollution (Air Pollution Catcher)
Week 10	Lab 10: Micro plastic Pollution and Its Impact on Human Health
Week 11	Lab 11: Acidity in water
Week 12	Lab 12: alkalinity in water
Week 13	Lab 13: Free chlorine Information
Week 14	Lab 14: Total hardness of water
Week 15	Lab 15: Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Warouw, Z. W. M., Purba, E. R., Tumewu, W. A., Wowor, E. C., & Wola, B. R. (2025). Development of interactive multimedia on environmental pollution topics with STEM approach for junior high school students. BIO-INOVED: Jurnal Biologi-Inovasi Pendidikan, 6(3), 342-352.	Yes
Recommended Texts	Kehar, N., Suhag, A. K., Chandio, M., Kehar, B. U. Z., & Shah, S. (2025). Examining the Environmental Education Themes Presented in Grade 8 Social Studies Sindh Textbook Board Jamshoro, Sindh. Regional Lens, 4(1), 151-161.	Yes

Websites	https://www.enelgreenpower.com/learning-hub/environmental-pollution https://www.britannica.com/science/pollution-environment
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Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Animal Physiology		Module Delivery		
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar		
Module Code	Bio-3613				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level	3	Semester of Delivery			6
Administering Department		Dept. of Biology	College	College of Science	
Module Leader	Dr.Anwar Abdulameer Mohammed		e-mail	anwarabdulameer@uodiyala.edu.iq	
Module Leader's Acad. Title		Assistant professor	Module Leader's Qualification		Ph.D.
Module Tutor	Dr.Anwar Abdulameer Mohammed		e-mail	anwarabdulameer@uodiyala.edu.iq	
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date			Version Number	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Introduction to physiology , understand function of each system of human body
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Students have to know role of each system in the body to maintain homeostasis.
Indicative Contents المحتويات الإرشادية	1. Introduction to Animal Physiology • Definition and scope • Relationship between structure and function • Levels of organization in animals 2. Nervous System Physiology • Structure and function of neurons • Nerve impulse transmission • Synaptic transmission • Reflex actions and neural integration 3. Circulatory System • Structure and function of the heart • Blood vessels and circulation • Blood composition and functions • Cardiac cycle and regulation 4. Digestive System Physiology • Structure and function of digestive organs • Enzymatic digestion and absorption • Regulation of digestive processes 5. Endocrine System • Hormones and their functions • Mechanism of hormone action • Major endocrine glands and physiological roles

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Lessons of all units will be offered in an interaction lecture where student participation is mandatory either by forming small discussion groups in class, or by exchanging ideas and question one another. 2. Where applicable students will be assigned problems to solve and encouraged to assess one another. 3. Learning material will be supplied to students in class or uploaded on Blackboard learning management system. 4. Students will also be regularly referred to relevant section of the prescribed text book. 5. Most of the tutorial work will be done as self-study or with the assistance of a tutor. 6. The teacher will facilitate lectures and laboratory experiment sessions with the assistance of a tutor or laboratory demonstrator. Assessment will be both formative and summative. Formative assessment refers to assessment whose purpose is to monitor student learning but will not be graded. Summative assessment refers to assessment given to students for grading such as theory tests, practical tests and examination.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ 15 اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.4

Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100
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Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
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Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to physiology , principles of physiology and its association with anatomy ect...,biochemistry
Week 2	Physiology of nervous system , divisions of the system , characteristics of plasma membrane
Week 3	Plasma membrane polarization , rest potential , action potential , threshold
Week 4	Synapses , types of synapses , neurotransmitters
Week 5	Conductivity of nerve impulses , stages of changing acetyl-choline and nor-adrenalin
Week 6	Exam
Week 7	Endocrine of system , mechanism of hormone action
Week 8	Pituitary gland structure , anterior lobe and posterior lobe hormones
Week 9	Thyroid gland and parathyroid description and hormones , important role of the hormones
Week 10	Adrenal gland cortex and medulla , description of each part of the gland and hormone secreted
Week 11	Physiology of digestive system , introduction to digestion ,role of salivary gland in digestion
Week 12	Role of stomach in digestion , role of gastric gland in digestion
Week 13	Intestinal stage of digestion in small intestine
Week 14	Second midterm exam
Week 15	Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Physiology of circulatory system , the blood ,PCV and ESR
Week 2	Lab 2: Counting of erythrocytes and leukocytes
Week 3	Lab 3: Estimation level of Hb and clotting time
Week 4	Lab 4: Blood groups and RH
Week 5	Lab 5: principles of estimation blood glucose level
Week 6	Lab 6: Exam
Week 7	Lab 7: Physiology of plasma membrane (selective permeability , hydrostatic pressure)
Week 8	Lab 8: Physiology of digestive enzymes like amylase , lipase , trypsin

Week 9	Lab 9: Estimation of albumin with laboratory
Week 10	Lab 10: Estimation of cholesterol and HLD
Week 11	Lab 11: Estimation of urea and creatinin
Week 12	Lab 12: Action of liver enzymes
Week 13	Lab 13: Exam
Week 14	Lab 14: different modern available fast and easy test for hormones
Week 15	Lab 15: important available test in laboratory for different pathological conditions

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Khan, M., Khinchi, P. J., Sampath, M. V., & Hemavathi, B. (2023). A textbook of animal physiology. Academic Guru Publishing House.	Yes
Recommended Texts	Khurana, I., & Khurana, A. (2025). Concise Textbook of Physiology- E-Book. Elsevier Health Sciences.	Yes
Websites	https://www.britannica.com/science/physiology https://www.physiology.org/career/teaching-learning-resources/student-resources/what-is-physiology?SSO=Y https://health-sciences.nwu.ac.za/physiology	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Biotoxicology		Module Delivery
Module Type	Elective		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	Bio-3614		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	3	Semester of Delivery	
Administering Department	Dept. of Biology	College	College of Science
Module Leader	Dr.Anaam Fuad Hussain	e-mail	anaamfuad@uodiyala.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr.Anaam Fuad Hussain	e-mail	anaamfuad@uodiyala.edu.iq
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date		Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	- Introducing the student to the science of toxicology in terms of the history of interest in it, its characteristics and its importance to humans and animals, and in the transformations carried out by living organisms on organic and mineral materials because they are organisms with enzymatic activity and the role of these organisms in producing toxins inside and outside the body of the living organism. - Study the effects of toxins on the physiologic, metabolic, reproductive, and developmental processes and body organ functions - Introducing the student to the technical developments taking place in this science, such as chemical and molecular methods. - Introducing the student to harmful toxins, studying their properties, how to remove them from the body, and knowing those that are used in the chemical and therapeutic industries.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Knowledge and Understanding - Define biological toxins and classify them according to their origin, structure, and mode of action. - Describe the sources of toxins produced by plants, animals, bacteria, fungi, and marine organisms. - Explain the biochemical mechanisms of toxicity and the physiological effects on target organisms. - Identify factors affecting toxin stability, potency, and environmental persistence. Cognitive Skills - Analyze case studies of toxin-related illnesses and outbreaks.

	2. Interpret laboratory results related to toxin detection and quantification. 3. Evaluate the risks of biological toxins in food, water, and the environment. Practical and Laboratory Skills 1. Apply standard laboratory techniques for isolation, identification, and quantification of biological toxins. 2. Follow biosafety guidelines in handling and disposal of toxic biological materials.
Indicative Contents المحتويات الإرشادية	1. Toxins and their sources 2. Biological toxins, their sources, and their effects on the organism producing and exposed to them 3. Know the benefits and harms of biotoxins 4. Study the biological transformations of toxins and manage the risks resulting from them 5. How to deal with toxic organisms 6. How to detect biotoxins 7. Isolation and purification of toxins 8. Knowing the lethal dose of toxins 9. Knowing the time period for the toxic effect to appear 10. How to detoxify and get rid of toxin from the body 11. The possibility of benefiting from toxic secondary metabolites in living organisms

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	1. Lessons of all units will be offered in an interaction lecture where student participation is mandatory either by forming small discussion groups in class, or by exchanging ideas and question one another. 2. Where applicable students will be assigned problems to solve and encouraged to assess one another. 3. Learning material will be supplied to students in class or uploaded on Blackboard learning management system. 4. Students will also be regularly referred to relevant section of the prescribed text book. 5. Most of the tutorial work will be done as self-study or with the assistance of a tutor. 6. The teacher will facilitate lectures and laboratory experiment sessions with the assistance of a tutor or laboratory demonstrator. Assessment will be both formative and summative. Formative assessment refers to assessment whose purpose is to monitor student learning but will not be graded. Summative assessment refers to assessment given to students for grading such as theory tests, practical tests and examination.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ 15 اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10

Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Toxicology (Definition & History of toxicity and biotoxins).
Week 2	Scope and ethical principles of Toxicology
Week 3	Biotransformation of Xenobiotics and Toxikinetics
Week 4	Hepatotoxicity: Mycotoxins
Week 5	Hepatotoxicity: Pyrrolizidines
Week 6	Algal hepatotoxicity
Week 7	Exam
Week 8	Neurotoxicity
Week 9	Nephrotoxicity
Week 10	Toxicity of the Skin and Intestine
Week 11	Respiratory Toxicity
Week 12	Cardiovascular Toxicity
Week 13	Toxicity of Male and Female Reproductive System
Week 14	Interesting of biotoxins
Week 15	Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Laboratory Planning and Preparation for Use
Week 2	Lab 2: Laboratory Equipment used in Toxicology Lab.
Week 3	Lab 3: Toxin Use Practices (reconstitution, dilution, administration)
Week 4	Lab4: Colorimetric method for detection of toxic secondary metabolites
Week 5	Lab5: Detection for Alkaloids by Precipitation Reactions
Week 6	Lab 6: Detection the cellular toxicity
Week 7	Lab 7: Detection the chemical contents for secondary metabolites of toxic organisms Gas Chromatography Mass Spectrometry(GCMS) Technique
Week 8	Lab 8: Exam
Week 9	Lab 9: Detection of biotoxins by Thin layer chromatography (TLC) technique
Week 10	Lab 10: Detection of biotoxins by High Liquid Performance Chromatography (HPLC) technique
Week 11	Lab11: Detection of biotoxins by enzyme linked Immunosorbent assay (ELISA) technique
Week 12	Lab 12: Determination of (Lethal Dose 50) LD50 toxin in experimental animal
Week 13	Lab 13: Cytotoxicity Assay of snake venom (<i>In Vitro</i>)
Week 14	Lab 14: Histological effects of biotoxins (<i>In Vivo</i>)
Week 15	Lab 14: Exam

Learning and Teaching Resources

مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Mycotoxins, (2008) Editor: Leslie. Poisonous plants in Iraq,(1980). Editor:Ali Alrawi Poisonous plants in southern united states,(2005). Editor: John W. Everest et al Algae (2006) Editor: Barsanti and Gualtieri Antibiotics Resistance of Bacteria to Antibiotics(2010) Dr. Editor:Mohammed F. Al-Marjani	Yes
Recommended Texts	Manual Of Methods Of Analysis Of Foods,(2016). By: Food Safety And Standards Authority Of India Ministry Of Health And Family Welfare Government Of India , New Delhi. The Pesticide Manual,(2012). Editor: C. MacBean.	Yes
Websites	https://poisoncontrol.utah.edu/publiced/plants https://poisonousplants.cvmbs.colostate.edu/home https://www.biotoxdoc.eu/ https://mycotoxinsite.com/home/?lang=en	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Microbiology (Aquatic and Soil)		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	Bio-3615		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	3	Semester of Delivery	
Administering Department	Dept. of Biology	College	College of Science
Module Leader	Dr. Iman Abbas Ali	e-mail	imanabbas@uodiyala.edu.iq
Module Leader's Acad. Title	Assistant professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Iman Abbas Ali	e-mail	imanabbas@uodiyala.edu.iq
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date		Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Enabling students to gain knowledge and understanding of microorganisms in soil and water 2. Enabling students to gain knowledge and understanding of life cycles in soil 3. Enabling students to gain knowledge and understanding of the most important cycles in water 4. Enabling students to gain knowledge and understanding of the decomposition of materials in soil and the role of microorganisms in it.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Understand :Different types of environmental pollution and their effects. Understand: The importance of biodiversity in maintaining ecological balance. Application: Water management techniques in agriculture. Analysis: The impact of fertilizer use on soil quality. Evaluation: The impact of industrial activities on air and water pollution. Innovation: Innovative solutions to the problem of water pollution.
Indicative Contents المحتويات الإرشادية	The guiding contents of the Water Environment and Soil Pollution course include a study of the sources of water and soil pollution, their effects on the environment and health, in addition to methods of prevention and treatment.

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	1. Lessons of all units will be offered in an interaction lecture where student participation is mandatory either by forming small discussion groups in class, or by exchanging ideas and question one another. 2. Where applicable students will be assigned problems to solve and encouraged to assess one another. 3. Learning material will be supplied to students in class or uploaded on Blackboard learning management system. 4. Students will also be regularly referred to relevant section of the prescribed text book. 5. Most of the tutorial work will be done as self-study or with the assistance of a tutor. 6. The teacher will facilitate lectures and laboratory experiment sessions with the assistance of a tutor or laboratory demonstrator. Assessment will be both formative and summative. Formative assessment refers to assessment whose purpose is to monitor student learning but will not be graded. Summative assessment refers to assessment given to students for grading such as theory tests, practical tests and examination.
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Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ 15 اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Soil Physical Properties
Week 2	Biotic factors
Week 3	Soil Microorganisms
Week 4	Contribution of Microbes to Nutrient Cycling
Week 5	Exam
Week 6	Climate Change and its impact on the microbial environment
Week 7	Pesticides and Microbes as Agents For Recycling Wastes (Detoxification and Biodegradation)
Week 8	Microbes as Agents for Recycling Wastes(Detoxification and Biodegradation)

Week 9	Water microbiology
Week 10	Exam
Week 11	What is a Salt water
Week 12	What is a Drinking Water Treatment Plant
Week 13	Liquid Waste (Sewage/Wastewater) Treatment
Week 14	Transporting Microorganisms throw waste water
Week 15	Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Components of Soil
Week 2	Lab 2: Enumeration of Soil Microorganism
Week 3	Lab 3: Isolation of soil yeast
Week 4	Lab 4: Isolation of Actinomycetes
Week 5	Lab 5: Exam
Week 6	Lab 6: Study of starch degradation by soil bacteria isolates
Week 7	Lab 7: Nitrogen cycle
Week 8	Lab 8: Carbon Cycle
Week 9	Lab 9: Isolation of Soil
Week 10	Lab 10: Exam
Week 11	Lab 11: Cellulytic Microorganism
Week 12	Lab 12: Winogradsky column
Week 13	Lab 13: Isolation of <i>E.Coli</i> bacteria from water
Week 14	Lab 14: The method bacterial culture
Week 15	Lab 15: Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Dubey, R. C., & Maheshwari, D. K. (2023). A textbook of microbiology. S. Chand Publishing.	Yes
Recommended Texts	Pandey, P. K., Mallik, S. K., & Yumnam, R. (Eds.). (2025). Handbook of Aquatic Microbiology. CRC Press. Gentry, T., Fuhrmann, J. J., & Zuberer, D. A. (Eds.). (2021). Principles and applications of soil microbiology. Elsevier.	Yes
Websites	https://www.mdpi.com/journal/sustainability/special_issues/Microbial_Ecosystems	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors

(50 - 100)	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Microbial Physiology		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	Bio-3616		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	3	Semester of Delivery	
Administering Department	Dept. of Biology	College	College of Science
Module Leader	Dr.Ibtihal Hameed Mohsin	e-mail	ibtihalhameed@uodiyala.edu.iq
Module Leader's Acad. Title	Assistant professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr.Ibtihal Hameed Mohsin	e-mail	ibtihalhameed@uodiyala.edu.iq
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date		Version Number	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1.Introduce the principles of microbial physiology as a branch of the life sciences. 2.Differentiate between eukaryotic and prokaryotic microorganisms. 3.Identify bacterial cell structures and understand their functions. 4.Understand the nutritional aspects of microorganisms and their methods of obtaining energy. 5.Study bacterial growth and learn methods for its estimation and calculation. 6.Understand catabolic and anabolic metabolic pathways in bacterial cells.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	A. Subject-Specific Skills: 1. Develop understanding and familiarity with the fundamental concepts presented within the various facts encountered in practical work. 2. Understand the interconnections between these concepts. 3. Establish a strong and solid foundation in microbial physiology. 4. Develop the ability to read and comprehend related scientific research and literature. B .Course-Specific Skills Objectives 1.Knowledge and Recall Skills 2.Comprehension and Analysis Skills 3. Application and Development Skills
Indicative Contents المحتويات الإرشادية	1. Introduction to Microbial Physiology - Scope and importance of microbial physiology - Overview of microbial cell structure and function 2. Microbial Cell Structure

	• Prokaryotic vs. eukaryotic microorganisms • Cell wall composition and differences (Gram-positive, Gram-negative, Archaea) • Cell membrane structure and transport systems 3. Microbial Growth • Growth phases and growth curve • Measurement of microbial growth • Factors affecting growth: temperature, pH, osmotic pressure, oxygen 4. Nutritional Requirements of Microorganisms • Macronutrients and micronutrients • Types of microbial nutrition (autotrophs, heterotrophs, phototrophs, chemotrophs) • Uptake and transport of nutrients 5. Microbial Metabolism • Overview of catabolism and anabolism • Enzymes and coenzymes • Energy production pathways: glycolysis, TCA cycle, oxidative phosphorylation • Fermentation pathways 6. Bacterial Respiration and Photosynthesis • Aerobic and anaerobic respiration • Electron transport chain • Photosynthetic microorganisms and pigments 7. Regulation of Microbial Metabolism • Feedback inhibition • Enzyme regulation • Genetic control of metabolic pathways 8. Adaptations to Extreme Environments • Psychrophiles, thermophiles, acidophiles, alkaliphiles, halophiles • Mechanisms of adaptation 9. Microbial Communication and Interaction • Quorum sensing • Biofilm formation • Symbiosis and antagonism
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	1. Lessons of all units will be offered in an interaction lecture where student participation is mandatory either by forming small discussion groups in class, or by exchanging ideas and question one another. 2. Where applicable students will be assigned problems to solve and encouraged to assess one another. 3. Learning material will be supplied to students in class or uploaded on Blackboard learning management system. 4. Students will also be regularly referred to relevant section of the prescribed text book. 5. Most of the tutorial work will be done as self-study or with the assistance of a tutor. 6. The teacher will facilitate lectures and laboratory experiment sessions with the assistance of a tutor or laboratory demonstrator. Assessment will be both formative and summative. Formative assessment refers to assessment whose purpose is to monitor student learning but will not be graded. Summative assessment refers to assessment given to students for grading such as theory tests, practical tests and examination.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ 15 اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.4

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Bacterial cell: Structure and Function
Week 2	Microbial Nutrition
Week 3	Uptake of Nutrients (transport mechanisms)
Week 4	Microbial Growth
Week 5	Influence of Environmental Factors on Growth: Solutes and Water Activity, pH, Temperature, Oxygen concentration , Radiation.
Week 6	Metabolism; Energy
Week 7	Oxidation-Reduction Reactions
Week 8	Electron Carriers
Week 9	Energy Release and Conservation
Week 10	Catabolism of Carbohydrates
Week 11	Catabolism of Proteins
Week 12	Catabolism of Lipids
Week 13	Anabolism (Biosynthesis); Synthesis of Sugars, Polysaccharides, synthesis of Purines, Pyrimidines, Nucleotides and Lipid synthesis.
Week 14	Synthesis of Amino Acids
Week 15	Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Culture Media
Week 2	Lab 2: Bacterial Counting
Week 3	Lab 3: Bacterial Growth Curve
Week 4	Lab 4: Growth Yield
Week 5	Lab 5: growth requirements
Week 6	Lab 6: The Effects of pH on Growth

Week 7	Lab 7: The Effects of Osmotic pressure on Growth
Week 8	Lab 8: The Effects of Temperature on Growth
Week 9	Lab 9: Effect of antimicrobial agents on microbial growth
Week 10	Lab 10: Major groups of antimicrobial agents
Week 11	Lab 11: Phenol and phenolic compounds.
Week 12	Lab 12: Alcohol, Halogens
Week 13	Lab 13: Heavy metals.
Week 14	Lab 14: Dey's, Detergents
Week 15	Lab 15: Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Mohammadi, A. T., Karami, S., Jahandideh, A., Sarejloo, S., Vaseghi, S., Rezaei, M. D., ... & Gholami, S. (2022). Human diseases Research and textbook 1: Heart, Diabetes, Bacterial, ADHD, skin. Nobel TM.	Yes
Recommended Texts	Mahon, C. R. (2022). Bacterial cell structure, physiology, metabolism, and genetics. Textbook of Diagnostic Microbiology, 1.	Yes
Websites	https://www.omicsonline.org/microbial-physiology/articles.php https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/microbial-physiology	

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية		
Module Title	Biological Control	Module Delivery

Module Type	Core			☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	Bio-3617				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level		3	Semester of Delivery		6
Administering Department		Dept. of Biology	College	College of Science	
Module Leader	Dr.Sanna Najim Abed		e-mail	sanaa.abed@uodiyala.edu.iq	
Module Leader's Acad. Title		Assistant professor	Module Leader's Qualification		Ph.D.
Module Tutor	Dr.Sanna Najim Abed		e-mail	sanaa.abed@uodiyala.edu.iq	
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date			Version Number		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		Semester	
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Upon completion of this course, students will be able to: 1. Explain the principles and history of biological control. 2. Identify different types of natural enemies (predators, parasitoids, pathogens). 3. Understand ecological interactions influencing biological control. 4. Evaluate the advantages and limitations of biological control strategies. 5. Apply laboratory and field techniques to study biological control agents.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Knowledge and Understanding • Define the principles and concepts of biological control in pest management. • Identify major biological control agents, including predators, parasitoids, and pathogens. • Explain the ecological and environmental factors influencing the success of biological control. • Describe classical, augmentative, and conservation biological control strategies. 2. Intellectual Skills • Analyze case studies of successful and unsuccessful biological control programs. • Evaluate the advantages, limitations, and potential risks of using biological control agents. • Compare biological control methods with chemical and cultural pest control strategies. 3. Practical and Professional Skills • Demonstrate techniques for identifying and monitoring biological control agents in the field or laboratory. • Apply appropriate methods for introducing and managing beneficial organisms. • Design a basic biological control program for a selected pest species.
Indicative Contents المحتويات الإرشادية	1. Introduction to Biological Control • Definition, history, and importance in pest management. • Role in sustainable agriculture and integrated pest management (IPM). 2. Types of Biological Control • Classical biological control – introduction of natural enemies from the pest's origin. • Augmentative biological control – mass production and periodic release of natural enemies.

	Conservation biological control – protecting and enhancing existing natural enemies.
	3. Agents of Biological Control - Predators: characteristics, examples, and ecological role. - Parasitoids: life cycles, host specificity, and applications. - Pathogens: fungi, bacteria, viruses, and nematodes in pest control.
	4. Ecological Principles of Biological Control - Pest–natural enemy interactions. - Population dynamics and control thresholds. - Factors affecting effectiveness (climate, habitat, crop diversity).
	5. Mass Rearing and Release Methods - Laboratory rearing techniques for beneficial organisms. - Field release strategies and timing.
	6. Evaluation of Biological Control Programs - Monitoring and assessment methods. - Success indicators and impact measurement.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	- Lessons of all units will be offered in an interaction lecture where student participation is mandatory either by forming small discussion groups in class, or by exchanging ideas and question one another. - Where applicable students will be assigned problems to solve and encouraged to assess one another. - Learning material will be supplied to students in class or uploaded on Blackboard learning management system. - Students will also be regularly referred to relevant section of the prescribed text book. - Most of the tutorial work will be done as self-study or with the assistance of a tutor. - The teacher will facilitate lectures and laboratory experiment sessions with the assistance of a tutor or laboratory demonstrator. Assessment will be both formative and summative. Formative assessment refers to assessment whose purpose is to monitor student learning but will not be graded. Summative assessment refers to assessment given to students for grading such as theory tests, practical tests and examination.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ 15 اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

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

Total assessment	100% (100 Marks)		
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Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Biological Control: Concepts and History
Week 2	Types of Biological Control: Classical, Augmentative, and Conservation
Week 3	Natural Enemies: Predators, Parasitoids, and Pathogens
Week 4	Ecological Principles of Biological Control
Week 5	Host-Parasite and Host-Predator Interactions
Week 6	Microbial Control Agents: Bacteria, Fungi, Viruses, and Nematodes
Week 7	Entomopathogenic Fungi and Their Applications
Week 8	Entomopathogenic Nematodes in Pest Management
Week 9	Plant-Microbe Interactions in Biological Control
Week 10	Role of Biological Control in Integrated Pest Management (IPM)
Week 11	Case Studies of Successful Biological Control Programs
Week 12	Risks and Non-target Effects of Biological Control
Week 13	Regulatory and Ethical Considerations
Week 14	Recent Advances and Future Trends in Biological Control
Week 15	Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1:Identification of Natural Enemies in the Laboratory
Week 2	Lab 2:Rearing of Predators and Parasitoids
Week 3	Lab 3:Maintenance of Predators and Parasitoids
Week 4	Lab 4:Isolation of Entomopathogenic Fungi
Week 5	Lab 5:Culturing of Entomopathogenic Fungi
Week 6	Lab 6:Bioassays for Testing Pathogenicity of Microbial Control Agents
Week 7	Lab 7:Application Methods of Biological Control Agents in the Field
Week 8	Lab 8: Exam
Week 9	Lab 9:Monitoring and Evaluating Biological Control Efficacy
Week 10	Lab 10:Sampling Techniques for Pests and Natural Enemies
Week 11	Lab 11:Microscopy Techniques for Studying Pathogens/1
Week 12	Lab 12:Microscopy Techniques for Studying Pathogens/2
Week 13	Lab 13:Data Collection and Statistical Analysis in Biological Control Studies
Week 14	Lab 14: Student Project Presentations on Selected Biological Control Agents
Week 15	Lab 15: Exam

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

Required Texts	Tanda, A. S. (2025). Advances in Biological Control Pest Management Technology. IK International Pvt Ltd. Corley, J. C., & Villacide, J. M. (2025). Ecology and biological control. In Biological Control of Insect Pests in Plantation Forests (pp. 95-113). Cham: Springer Nature Switzerland. Copping, L. G. (2009). The manual of biocontrol agents (formerly the Biopesticide Manual). British Crop Production Council (BCPC), Farnham.	Yes
Recommended Texts	Mason, P. G. (2021). Biological control: global impacts, challenges and future directions of pest management. Csiro Publishing.	Yes
Websites	https://www.nj.gov/agriculture/divisions/pi/prog/buglab/what-is-biological-control/ https://www.cabi.org/what-we-do/invasive-species/biocontrol/	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
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