

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	General Zoology		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Bio-101		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	1	Semester of Delivery	
Administering Department	Bio	College	COS
Module Leader	Dr. Firas Hameed	e-mail	firaskhathayer@gmail.com
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Abeer Attaala	e-mail	abesbio53@uomosul.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	02/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Objectives أهداف المادة الدراسية</p>	<p>This study aims</p> <ol style="list-style-type: none"> 1. The student's comprehension of the concept of the course and his ability to distinguish between it and other sciences. 2. Addressing a comprehensive description of the various body systems, with a focus on ruminant field animals and poultry. 3. Studying the vital processes that occur in the animal's body that transform the nutrients that the animal eats and turn them into animal products or other secondary waste. 4. Basic and physiology of growth and reproduction. 5. Keep up with the development that is happening in the world
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> 1. The students understand different physiological mechanisms in the body. 2. Help the students to master the interaction and relationships between body systems. 3. The development of student's skills for going into relationship between the physiological and pathological disorders. 4. The students understand mode of action each physiological test. 5. Help the students to master the procedure of each physiological test. 6. The development of student's skills for going into the laboratory work experience as specialist who has an excellent background on all physiological tests and their relationship to disease and not as technician operating advic
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Part A – Theoretical lectures</u></p> <p>Introduction to Physiology. Cell physiology. The mechanisms of transports across the cell membrane. Phagocytosis mechanism. Pinocytosis mechanism. [10 hrs]</p> <p>Blood physiology. Physical Characteristics of blood. Plasma, Erythrocytes, Erythropoiesis. erythrocyte disorders. Types of anemia. Leukocytes. Functions of all types of Leukocytes. Platelets, Hemostasis mechanism, Fibrinolysis.[18hrs]</p> <p>Physiology of Digestion system. Functions of the Digestive System. Nervous Regulation of the Digestive System. Function of Stomach. Regulation of Gastric Secretion. Pancreas. Gall Bladder. Small Intestine. Large intestine [18hrs]</p> <p>Revision problem classes [3 hrs]</p> <p><u>Part B – Practical labs</u></p> <p>General safety instructions in the laboratory. Introduction Circulatory system. Fragility test 1. Fragility test 2. Total Red Blood Cell count. differential count. Estimation Hemoglobin. [18 hrs]</p> <p>PCV test. Platelets count. : ESR test. Bleeding time Test. Blood pressure. Physiological and pathological variation of Blood pressure. Blood groups. Respiratory test.[18 hrs]</p>

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Expanding students' perceptions about this science and its contents . Various techniques were used such as. Data show , Microscope, Posters . Students do study the following fields: An introduction to the study of Physiology of the body. Definition of body systems and understands how this system work under normal conditions. Definition of the techniques uses to estimation of body parameters. Study the disorders of this systems physiology and study the diseases results from disorders in homeostats. The relationships between the different body systems. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.
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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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

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

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

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

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Botany General		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Bio-121		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	1	Semester of Delivery	
Administering Department	Bio	College	COS
Module Leader	Dr. Wasan Salih	e-mail	wassbio54@uomosul.edu.iq
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Allaa Huseen	e-mail	alaasbio63@uomosul.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	02/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	This study aims <ol style="list-style-type: none"> 1. Clarification of basic information about the basic vocabulary of the curriculum and how to use it in the anatomy of plants in practice. 2. Teaching students how to prepare different plant tissue sections. Conducting histological comparisons between different aggregates.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> 1. 1. Students became able to understand nature of higher plants tissues. 2. 2. Helping students to identify plants tissues. 3. 3. Encourage the students to improve skills of plant anatomy and proteins and understanding how to distinguish between amino acids
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> General Plant, The important of studying plant anatomy. The cell wall, Formation of the cell wall. Plant Tissues, 1. Meristematic tissues, 2. Permanent tissues. Parenchyma tissue, collenchma tissues, Sclerenchyma tissues. [10 hrs] Dermal Tissues, The Periderm. The Epidermis. Stele Biology. Trichomes. The Xylem, Primary and secondary xylem. The Phloem, Primary and secondary phloem. [12 hrs] The Stem, stem in monocotyledon. stem in dicotyledon. stem in dicotyledon. The Root. root in monocotyledon, root in dicotyledon. Secondary growth.. [10 hrs] Revision problem classes [3 hrs] <u>Part B – Practical labs</u> The plant cell, The cell wall, pits. Intercellular spaces, living & nonliving components. Plant Tissues, Meristematic Tissues. Apical M.T., Lateral M.T. Intercalary M.T. Permanent Tissues, Parenchyma tissues. Collenchyma Tissues. Sclerenchyma T. [18 hrs] Fibers, Sclerides. Dermal T. , Epidermis, Stomata. Types & components, subsidiary cells. The Xylem. The phloem. Cross section in monocotyledon & dicotyledon root. Cross section in monocotyledon. [18 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Expanding students' perceptions about this science and its contents. Various techniques were used such as. Data show , Microscope, Posters , Samples of plants keep in alcoholic solution . Students do study the following fields: Higher Plants structures. Anatomy procedures. Learning compositions of plant tissues. Comparison between monocots and dicots tissues. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.
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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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	96	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

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

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: The plant cell, The cell wall, pits.
Week 2	Lab 2: Intercellular spaces, living & nonliving components.
Week 3	Lab 3: Plant Tissues, Meristematic Tissues.
Week 4	Lab 4: Apical M.T., Lateral M.T. Intercalary M.T.
Week 5	Lab 5: Permanent Tissues, Parenchyma tissues.
Week 6	Lab 6: Collenchyma Tissues .
Week 7	Lab 7: Sclerenchyma T.
Week 8	Lab 8: Fibers, Sclerides.
Week 9	Lab 9: Dermal T., Epidermis, Stomata.

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

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

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Entomology		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Bio-211		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	2	Semester of Delivery	
Administering Department	Bio	College	COS
Module Leader	Dr. Muneef Abid Mustafa	e-mail	munsbio6@uomosul.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Aulfat tahseen Ammar Ghanim Younis Ibraheem	e-mail	Alfsbio76@uomosul.edu.iq Amrksbio100@uomosul.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	02/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	General Zoology	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	This study aims <ol style="list-style-type: none">1. Enable the student to identify arthropods.2. The most important people that it includes.3. Expand with the insect class and identify the external and internal morphological characteristics of insects.4. Know the taxonomic position of insects.5. Classification methods using taxonomic records.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none">1. students learn how to distinguish an insect from other arthropoda2. students get knowledge about the insect's body parts in detail for the head, thorax and abdomen3. students learn the way of feeding insects by knowing the parts of their mouth parts with a microscope
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> Introduction of insect and distinguish an insect from other arthropoda. The type of orientation on head , types of sutures, types of antenna (1). Antenna 2 , Mouth parts of grasshopper and cockroach . [15 hrs] Mouth parts of housefly + Mouth parts of horsefly and is table fly .Mouth parts. of mosquito. [10 hrs] Mouth parts. of honey bee Mouth parts of plant bug . Mouth parts of bed bug Mouth parts of butterfly .Types of legs , Types of wings[11 hrs] Revision problem classes [3 hrs] <u>Part B – Practical labs</u> Introduction of insect ,distinguish an insect from other arthropoda. The type of orientation on head , types of sutures + types of antenna (1) .Antenna 2,Mouth parts of grasshopper and cockroach, Mouth parts of housefly. [18 hrs] Mouth parts of horsefly and is table fly .Mouth parts of honey bee . Mouth parts of mosquito. Mouth parts of plant bug . Mouth parts of bed bug. Mouth parts of butterfly Types of legs Types of wings. [18 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	79	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	5
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 in Entomology.
Week 2	Structure of insects.
Week 3	Exoskeleton.
Week 4	Head.
Week 5	Antennae.
Week 6	Mouth parts.
Week 7	Thorax .
Week 8	Legs, Wings
Week 9	Digestive System part 1
Week 10	Digestive System part 2
Week 11	Respiratory System part 1
Week 12	Respiratory System part 2
Week 13	Circulatory System part 1
Week 14	Circulatory System part 2
Week 15	Reproductive System

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	The Insects: Structure and Function , R. F. Chapman - Fifth Edition , Published by Cambridge University Press, 2013	Yes
	AN OUTLINE OF ENTOMOLOGY P.J. Gullan and P.S. Cranston, 2014 .	Yes
	Chapman, R.F. (1998). “ The Insects Structureand Function “ Ed⁴ . English Universities Press LTD.	Yes
	Eldridge, B.F. and Edman, J.D. (2012). “Medical Entomology”. Kluwer Academic Publishers.	Yes
Recommended Texts	Nesbit, C. and Nesbit, A. (2017). “Insecta” teNeues Publishing Company, 220 pages .	No
Websites	https://www.britannica.com/science/entomology https://www.royensoc.co.uk/understanding-insects/what-is-entomology/	

Grading Scheme

مخطط الدرجات

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

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Plant Anatomy		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Bio-212		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	2	Semester of Delivery	
Administering Department	Bio	College	COS
Module Leader	Dr. Wasan Salih Hussain	e-mail	wassbio54@uomosul.edu.iq
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Badia Abd Al-Razzak Malla Obaida Ali Ahmad Ali Majed Shukr	e-mail	badia.jamal@uomosul.edu.iq alisbio107@uomosul.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	02/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	This study aims <ol style="list-style-type: none"> 1. Clarification of basic information about the basic vocabulary of the curriculum and how to use it in the anatomy of plants in practice. 2. Teaching students how to prepare different plant tissue sections. 3. Conducting histological comparisons between different aggregates.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> 1. 1. Students became able to understand nature of higher plants tissues. 2. 2. Helping students to identify plants tissues. 3. 3. Encourage the students to improve skills of plant anatomy and proteins and understanding how to distinguish between amino acids
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> Plant Anatomy, The important of studying plant anatomy .The cell wall, Formation of the cell wall. Plant Tissues, 1. Meristematic tissues, 2. Permanent tissues . Parenchyma tissue, collenchma tissues , Sclerenchyma tissues. [10 hrs] Dermal Tissues, The Periderm. The Epidermis. Stele Biology .Trichomes. The Xylem , Primary and secondary xylem. The Phloem, Primary and secondary phloem. [12 hrs] The Stem, stem in monocotyledon. stem in dicotyledon. stem in dicotyledon. The Root. root in monocotyledon, root in dicotyledon. Secondary growth.. [10 hrs] Revision problem classes [3 hrs] <u>Part B – Practical labs</u> The plant cell, The cell wall, pits. Intercellular spaces, living & nonliving components. Plant Tissues , Meristematic Tissues .Apical M.T., Lateral M.T. Intercalary M.T. Permanent Tissues, Parenchyma tissues .Collenchyma Tissues. Sclerenchyma T. [18 hrs] Fibers, Sclerides. Dermal T. ,Epidermis, Stomata . Types & components , subsidiary cells. The Xylem. The phloem. Cross section in monocotyledon & dicotyledon root. Cross section in monocotyledon. [18 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

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

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: The plant cell, The cell wall, pits.
Week 2	Lab 2: Intercellular spaces, living & nonliving components.
Week 3	Lab 3: Plant Tissues, Meristematic Tissues.
Week 4	Lab 4: Apical M.T., Lateral M.T. Intercalary M.T.
Week 5	Lab 5: Permanent Tissues, Parenchyma tissues.
Week 6	Lab 6: Collenchyma Tissues.
Week 7	Lab 7: Sclerenchyma T.
Week 8	Lab 8: Fibers, Sclerides.
Week 9	Lab 9: Dermal T., Epidermis, Stomata.

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

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

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Invertebrates		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Bio-213		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	2	Semester of Delivery	
Administering Department	Bio	College	COS
Module Leader	Dr. Najah Subhi Nayef	e-mail	Najahsobhi@gmail.com
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Senaa Abdullah Ali Fulk Abdulhafedh Raja Abdulrahman	e-mail	sensbio23@uomosul.edu.iq fulk7676khattab@gmail.com
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	02/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	General Zoology	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	This study aims: 1. Convey information about invertebrates to students about their types. 2. Knowing the methods of its diagnosis and its activities. 3. Keep up with the development that is happening in the world.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Harmful or Dangerous Invertebrates. 2. Medical importance of invertebrates. 3. Through this study the students recognize the invertebrates. 4. We comforting the students to diagnosis the invertebrates animals.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> I Characteristics of Invertebrates. Classification of Invertebrates. Importance of Invertebrates. Protozoan Phyla: Characteristics of Protozoan Phyla Amoeba Proteus. Phylum Porifera .General Characteristics of Porifera.,Classification of Phylum Porifera: Canal Systems in Sponges, Phylum Cnidaria or Coelenterata. General Characteristics of Cnidaria Classification of Phylum Cnidaria ,Hydra.[10 hrs] , Pseudocoelomates ,General Characteristics of Pseudocoelomates ,Phylum Rotifera or Rotatoria ,General Characteristics of Phylum Rotifera: Classification of Phylum Rotifera Brachionus rubens[8 hrs] Phylum Annelida General Characteristics of Phylum Annelida : Classification of Phylum Annelida. Nereis .PHYLUM ARTHROPODA .General characteristics of phylum Arthropoda .Classification of Phylum Arthropoda Astacus . [10 hrs] PHYLUM Mollusca .General characteristics of phylum Mollusca Phylum Echinodermata General characteristics of Phylum Echinodermata Classification of phylum Echinodermata .Asterias (Seastar or Starfish) . [8 hrs] Revision problem classes [3 hrs] <u>Part B – Practical labs</u> Introduction of Invertebrates .Protozoa.Didinium, stentor . Noctiluca.Foraminifira,leucosolenia .Spicules. [18 hrs] Spongin fibers.Gemmules.Coelenterata.Hydra.Obelia,Medosa.Physalia.Aurelia,Metridium,T ubipo a. Nereis,Hirud .Arthropoda. [18 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	<p>Expanding students' perceptions about this science and its contents. Various techniques were used such as. Data show , Microscope, Posters , Samples of Invertebrates keep in alcoholic solution Students do study the following fields: Definition of Invertebrates , Characteristics of Invertebrates, Classification of Invertebrates .Instruction. Protozoa invertebrates. Platyhelminthes and arthropoda. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.</p>
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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	Characteristics of Invertebrates.
Week 2	Classification of Invertebrates.
Week 3	Importance of Invertebrates.
Week 4	Protozoan Phyla: Characteristics of Protozoan Phyla <i>Amoeba Proteus</i>
Week 5	Phylum Porifera General Characteristics of Porifera.
Week 6	Classification of Phylum Porifera : Canal Systems in Sponges
Week 7	Phylum Cnidaria or Coelenterata General Characteristics of Cnidaria
Week 8	Classification of Phylum Cnidaria Hydra
Week 9	Pseudocoelomates General Characteristics of Pseudocoelomates
Week 10	Phylum Rotifera or Rotatoria General Characteristics of Phylum Rotifera : Classification of Phylum Rotifera <i>Brachionus rubens</i>
Week 11	Phylum Annelida General Characteristics of Phylum Annelida :
Week 12	Classification of Phylum Annelida <i>Nereis</i>
Week 13	PHYLUM ARTHROPODA General characteristics of phylum Arthropoda Classification of Phylum Arthropoda <i>Astacus</i>
Week 14	PHYLUM Mollusca General characteristics of phylum Mollusca
Week 15	Phylum Echinodermata General characteristics of Phylum Echinodermata Classification of phylum Echinodermata <i>Asterias</i> (Seastar or Starfish)

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction of Invertebrates.
Week 2	Lab 2: Protozoa.

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

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

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Plant Taxonomy		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Bio-214		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	2	Semester of Delivery	
Administering Department	Bio	College	COS
Module Leader	Dr. May Taha Hamid	e-mail	mayasbio44@uomosul.edu.iq
Module Leader's Acad. Title	lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Zakaria Sami Abdul-razzaq Najlaa Tariq Abeer Ahmad	e-mail	Zaksbio67@uomosul.edu.iq Najtsbio79@uomosul.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	02/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Objectives أهداف المادة الدراسية</p>	<p>This study aims</p> <ol style="list-style-type: none"> 1. Knowledge Development: Developing the student's ability to recall what he has learned About microorganisms that live in soil and water. 2. To improve the comprehension level and to develop the ability On interpretation, prediction and conclusion. 3. Developing applied capabilities. 4. Giving the student the ability to analyze. 5. Developing the student's ability to integrate ideas and information (level Kebaltre Synthesis (which is the opposite of parse. 6. Evaluation: Developing the student's ability to judge the value of the learned material
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> 1. Students became able to understand nature of lower plants. 2. Helping students to identify algae. 3. Encourage the students to improve skills of sampling & diagnosing of lower plants.
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Part A – Theoretical lectures</u></p> <p>Introduction To Algal Characteristics and Diversity. The Classification of Algae & Fundamental characteristics that depend on algae classification Vegetative Structure : Life cycles algae . Blue –green algae Division. Division Chlorophyta : Important features & Orders& Class Chlorophyceae orders. [10 hrs]</p> <p>, Class Charophyceae orders .Order Charales& Family Volvocaceae .& Family Zygnemataceae Family Oedogonaceae . Family Ulvaceae& Rhodophyta Phaeophyta. Xanthophyta. Diatoms. Archegonate plants [8 hrs]</p> <p>Bryophyta : Habitate ,Life cycle , sexuality , evolution , Comparative Morphology Division Pterophyta (Ferns) & Division Lycpphyta. [10 hrs]</p> <p>.Division Equisitophyta & Division Psilophyta. [8 hrs]</p> <p>Revision problem classes [3 hrs]</p> <p><u>Part B – Practical labs</u></p> <p>Algae definition.Division: Cyanophyta .Division: Chlorophyta(Volvocales.(Division: chlorococcales & other orders. Division: Xanthophyta(Vaucheriales.(Division: Division: Phaeophyta(Lamunariales & other orders.(Division: Rhodophyta(Siphoniales.(Archaeogoniate definition.[20 hrs]</p> <p>Non-Vascular plants.- Division: Marchantiophyta. Division: Anthocerotophyta. Division: Pteridophyta Gymnosperms Angiosperms .Applications [16hrs]</p>

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

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

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

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

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

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

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
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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	Biochemistry		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Bio-215		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	2	Semester of Delivery	
Administering Department	Bio	College	COS
Module Leader	Dr. Haitham Luqman Shihab Al-Hayali	e-mail	haysbio68@uomosul.edu.iq
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Thaer Mohamed Hasan Eman Sameer	e-mail	thasbio42@uomosul.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	02/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	This study aims <ol style="list-style-type: none"> 1. Communicate biological information to students about the basic biological and molecular components of a cell . 2. Methods of measuring and conducting laboratory chemical tests . 3. Keeping up with the development that is happening in the world of laboratory materials and equipment.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> 1. Giving the student the most important basics of biochemistry and understanding the biological interactions that take place within the biological system 2. The student's understanding of the most important biological components inside the body, such as sugars, proteins, fats, their components and their interactions 3. Giving a clear picture of the most important metabolic reactions that occur to the biological components inside the body. 4. Teaching students how to deal with laboratory tools correctly and safely and how to prevent them from damage 5. The student practically understood how to detect the types of carbohydrates and the most important tests related to carbohydrates. 6. 3-Detecting practically amino acids and proteins and understanding how to distinguish between amino acids
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> Principle of biochemistry , water. Buffers and pH. Carbohydrates composition. Carbohydrates functions.[15 hrs] , Types of amino acids, their composition. Amino acids reactions. Proteins structures, types .Proteins reactions. Lipids classification. Lipids functions. Fatty acids, saturated. Unsaturated fatty acids [8 hrs] Metabolism reactions . Glycolysis reaction .Proteins metabolism.[18hrs] Revision problem classes [3 hrs] <u>Part B – Practical labs</u> Quantitative test for carbohydrates, Molish's test. Benedict's test, Barfoed's. Selivanoff 's test, Bial's test. Hydrolysis of carbohydrates. Hydrolysis of disaccharides reactions. Hydrolysis of polysaccharides. [16hrs] Proteins have many functions and shapes. Types of proteins. Ninhydrin test, Hopkincole reaction or glyoxylic acid reaction. Millon test, Xanthoprotic test. Sakaguchi test, Lead acetate test. Biuret test, Proteins extraction . Spectrophotometric method, Biuret method, lowry (Folin) method. Lipids, Fatty acids, Lipids classification, Acroleine test, Unsaturated test, Acid value , Iodine number, Estimation of reducing sugar by nelson. [20 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	61	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	64	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

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

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Quantitative test for carbohydrates, Molish's test.
Week 2	Lab 2: Benedict's test, Barfoed's.
Week 3	Lab 3: Selivanoff 's test, Bial's test.
Week 4	Lab 4: Hydrolysis of carbohydrates.
Week 5	Lab 5: Hydrolysis of disaccharides reactions.
Week 6	Lab 6: Hydrolysis of polysaccharides.
Week 7	Lab 7: Proteins have many functions and shapes.
Week 8	Lab 8:. Types of proteins.

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

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

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Microbiology		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Bio-216		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	2	Semester of Delivery	
Administering Department	Bio	College	COS
Module Leader	Dr. Khansaa Younis Mohammed	e-mail	Kansbio50@uomosul.edu.iq
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Sahar Salim Al-Nakkar Muna Mohammed Essam Ashwaq Hazim	e-mail	saharsalim@uomosul.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	02/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	This study aims to: <ol style="list-style-type: none"> 1. Giving information to the student regarding the origins of microbiology. 2. Defining the types of microorganisms. 3. Studying the composition of internal and external microorganisms. 4. Branches of microbiology.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> 1. Students were able to learn the latest information on microorganisms. 2. The student should know the most important terms related to the subject. 3. The student should understand the most important methods of isolating microorganisms. 4. The student should know the important and distinctive characteristics of microorganisms. 5. Identifying "bacteria" by studying the types of microscopes used and then examining them in their natural form under a light microscope. This is followed by the use of different staining methods to examine the cellular structures.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> General Introduction. Classification of microorganisms . Prokaryotes , Eukaryote . General characteristics and types of Prokaryotic and Eukaryotic microorganisms. The impact of microorganisms on humans. [8hrs] The prokaryotic cell: size, shape, and arrangement. Prokaryotic cell structure : External cell structures: Appendages- :Flagella, Function of Flagella - .Axial Filaments (Periplasmic Flagella -.(Archaeal Flagella. External cell structures: Appendages: Fimbriae , Function of Fimbriae .Pili, types of Pili , and function. The bacterial surface coating or glycocalyx. Specialized functions of the glycocalyx .Biofilm. [10 hrs] The Cell Envelope, The Cell Wall, The major functions of the cell wall are: Composition and Characteristics. Gram-Positive Cell Walls , Gram-Negative Cell Walls. Atypical Cell Walls: The cells have no walls, Acid-Fast Cell Walls . Archaeal Cell Walls . The Plasma (Cytoplasmic) Membrane. Functions of the Cell Membrane. The Movement of Materials across Membranes. Archaeal Plasma Membranes. [10 hrs] Cytoplasm. Inclusions. The Bacterial Cytoskeleton. Ribosomes . Chromosomes and Plasmids Endospores. Structure of the endospore. Chemical composition of endospores: Properties of endospores. Germination. [8 hrs] Revision problem classes [3 hrs] <u>Part B – Practical labs</u> Disadvantages of bacteria. Advantages of bacteria. Types of Microscopes. Introduction on Bacteria . Bacterial smear preparation. Bacterial smear preparation. Bacterial staining . Simple stain . Gram stain . [18 hrs] Capsule stain. Spore stain . Acid-Fast stain. Motility tests. Sterilization Methods. Part 1 Disinfection Methods. Part 1. Culture media. part 1. [18 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

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

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

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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

Learning and Teaching Resources

مصادر التعلم والتدريس

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

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	Insect Taxonomy		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Bio-221		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	2	Semester of Delivery	
Administering Department	Bio	College	COS
Module Leader	Dr. Muneef Abid Mustafa	e-mail	munsbio6@uomosul.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Aulfat tahseen Ammar Ghanim Younis Ibraheem	e-mail	Alfsbio76@uomosul.edu.iq Amrksbio100@uomosul.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	02/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	This study aims <ol style="list-style-type: none"> 1. Enable the student to identify arthropods. 2. The most important people that it includes. 3. Expand with the insect class and identify the external and internal morphological characteristics of insects. 4. Know the taxonomic position of insects. 5. Classification methods using taxonomic records.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> 1. students learn how to collect the insect and keep their Samples of insects in alcoholic solution 2. students get knowledge about the classification of insects , when they saw any insect they will be know anything about it 3. student learn how to dry insects and make painting of dried insects
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> Introduction in Entomology, Structure of Nervous System part, Structure of Nervous System part ,Endocrine System part 1, Endocrine System part 2. [15hrs] Morphogeneseis part 1, Morphogeneseis part 2, Molting part 1, Molting part 2, senses part 1, senses part 2. [10 hrs] P Communication part 1. Communication part 2, Taxonomy part 1, Taxonomy part 2. [8hrs] Revision problem classes [3 hrs] <u>Part B – Practical labs</u> Abdominal appendages , metamorphosis Classification of insect- thysanura, collembolan Odonata, Dermaptera. Orthoptera , Dictyoptera. Mallophage , anoplura [18 hrs] Ephemeroptera , hemiptera. Homoptera , thysanoptera , isopteran. Hymenoptera , diptera , Lepidoptera. [18 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Expanding students' perceptions about this science and its contents. Various techniques were used such as. Data show , Microscope, Posters , Samples of insects keep in alcoholic solution . Students do study the following fields: Abdominal appendages and metamorphosis of insects. Classification of insect. Pterygota and apterygota, Exopterygota and endopterygota. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.
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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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Introduction in Entomology.
Week 2	Structure of Nervous System part 1
Week 3	Structure of Nervous System part 2
Week 4	Endocrine System part 1
Week 5	Endocrine System part 2
Week 6	Morphogenesis part 1
Week 7	Morphogenesis part 2
Week 8	Molting part 1
Week 9	Molting part 2
Week 10	senses part 1
Week 11	senses part 2
Week 12	Communication part 1
Week 13	Communication part 2
Week 14	Taxonomy part 1
Week 15	Taxonomy part 2

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الأسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Abdominal appendages
Week 2	Lab 2: metamorphosis
Week 3	Lab 3: Classification of insect-thysanura
Week 4	Lab 4: collembola
Week 5	Lab 5: Odonata
Week 6	Lab 6: Dermaptera
Week 7	Lab 7: Dictyoptera
Week 8	Lab 8: Orthoptera
Week 9	Lab 9: Mallophage

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	The Insects: Structure and Function , R. F. Chapman - Fifth Edition , Published by Cambridge University Press, 2013	Yes
	AN OUTLINE OF ENTOMOLOGY P.J. Gullan and P.S. Cranston, 2014 .	Yes
	Chapman, R.F. (1998). “ The Insects Structureand Function “ Ed⁴ . English Universities Press LTD.	Yes
	Eldridge, B.F. and Edman, J.D. (2012). “Medical Entomology”. Kluwer Academic Publishers.	Yes
Recommended Texts	Nesbit, C. and Nesbit, A. (2017). “Insecta” teNeues Publishing Company, 220 pages .	No
	Richards, O.W. and Davies, R.G. (1973). “Entomology”. London:Chapman and Hall LTD.	Yes
	Prakash, A. (2001). “Laboratory Manual of Entomology” . Published by K.K. Gupta for New Age International (P) LTD. NewDelhi, India.	Yes
Websites	https://www.royensoc.co.uk/understanding-insects/what-is-entomology/ https://naturalhistory.si.edu/research/entomology	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
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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	Plant Taxonomy		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Bio-222		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	2	Semester of Delivery	
Administering Department	Bio	College	COS
Module Leader	Dr. May Taha Hamid	e-mail	mayasbio44@uomosul.edu.iq
Module Leader's Acad. Title	lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Zakaria Sami Abdul-razzaq Ali Ahmad Ali Abeer Ahmad	e-mail	zaksbio67@uomosul.edu.iq alisbio107@uomosul.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	02/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	This study aims <ol style="list-style-type: none"> 1. Introduce the student to the principles of modern plant taxonomy (Phylogentic classification) which based on a set of taxonomical evidence (comparative Morphology, comparative Anatomy, Cytological taxonomy, etc.) 2. Demonstrate how to use the taxonomic evidence in designing taxonomical keys to distinguish between different plant taxa.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> 1. 1. Students became able to understand nature of higher plants. 2. 2.Helping students to identify plants. 3. 3. Encourage the students to improve skills of sampling & diagnosing of higher plants.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> Introduction to plant taxonomy; its characters and relation with other sciences. Basic principles, & Functions of the of taxonomy. [8 hrs] Types of taxonomy; Types of classification systems. Taxonomy of living organisms; taxonomy of Plant kingdom.Characters of scientific names; International Codes of Botanical Nomenclature & their principles; nomenclatural type . [10 hrs] The terms that used in the description of vegetative organs (Roots, Stems, & Leaves.(The typical flower ؛ Position of the ovary؛ Aestivation. Androecium؛ Gynoecium; Symmetry of flowers & Placentation:؛ [8 hrs] Inflorescence (component & types؛(floral Diagram.: Inflorescence (component & types(Floral Modifications And Inflorescences .The Fruits Types [10 hrs] Revision problem classes [3 hrs] <u>Part B – Practical labs</u> General Terms used in plant Taxonomy .classification of plants depending on habit. classification of plants depending on environments. The Root in Plants , types of root , modification of roots. The stem in Plants , types of stem in plants ، modifications of stem in plants. The leaves in plants , simple & compound leaves ,types of leaves in plants ،modifications of leaves in plants.Flowers in plants. The Seeds (component & types); Pollen grain & pollination. [20 hrs] . Taxonomy of Plant kingdom; Characters of Seed plants. Gymnospermae (general characters, taxonomy, example family pinaceae.(Angyospermae (general characters, taxonomy, example.(Examples on monocotyledons families. Examples on dicotyledons families.[16 hrs

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

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

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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

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

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

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Parasitology		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Bio-223		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	2	Semester of Delivery	
Administering Department	Bio	College	cos
Module Leader	Dr. Najah Subhi Nayef	e-mail	Najahsobhi@gmail.com
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Senaa Abdullah Ali Fulk Abdulhafedh Raja Abdulrahman	e-mail	sensbio23@uomosul.edu.iq fulk7676khattab@gmail.com
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	02/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

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

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

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

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction of practical parasitology.
Week 2	Lab 2: Protozoa.
Week 3	Lab 3: <i>Endolimax nana ,Iodamoeba butchlii.</i>

Week 4	Lab 4: <i>Entamoeba coli</i> , Ciliophora.
Week 5	Lab 5: Intestinal flagellates , <i>Gardia lamblia</i>
Week 6	Lab 6: Atrial flagellat, <i>Trickomonas vaginalis</i>
Week 7	Lab 7: Blood and tissue flagellates
Week 8	Lab 8: <i>Leishmania</i> , <i>Trypanosoma</i>
Week 9	Lab9: Sporozoa, <i>Plasmodium</i> , <i>Platyhlminthes</i> .
Week10	Lab 10: <i>Diphyllobothrium latum</i>
Week 11	Lab 11: <i>Taenia saginata</i> , <i>Taenia solium</i> .
Week 12	Lab 12: <i>Echinococcus granulosus</i> .
Week 13	Lab 13: Trematoda, <i>Fasciola hepatica</i> , <i>Fasciolopsis buski</i>
Week 14	Lab 14: Schistosomatidae.
Week 15	Lab 15: Nematelminthes.

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

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Metabolism		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Bio-224		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	2	Semester of Delivery	
Administering Department	Bio	College	COS
Module Leader	Dr. Haitham Luqman Shihab Al-Hayali	e-mail	haysbio68@uomosul.edu.iq
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Thaer Mohamed Hasan Eman Sameer	e-mail	thasbio42@uomosul.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	02/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	This study aims <ol style="list-style-type: none"> 1. Communicate biological information to students about the basic biological and molecular components of a cell . 2. Methods of measuring and conducting laboratory chemical tests . 3. Keeping up with the development that is happening in the world of laboratory materials and equipment.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> 1. Students' understanding of the synthesis of nucleotides and how ribose sugar and purine or pyrimidine base are associated with the phosphate group 2. The structure of DNA and RNA and its role in transferring genetic information and building proteins 3. Understand the fundamentals of enzymes, their chemical structure and their role in stimulating chemical reactions within the body
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> Nucleotides and their synthesis. Synthesis of Nucleotides. Chemistry of purines. Chemistry of pyrimidines. Nucleic acids. Nucleic acids components. Nucleotides Absorb Ultraviolet Light. DNA structure, DNA replication. [14 hrs] protein-synthesizing, Nucleic acids levels. Nucleotides serve divers physiological function. Cyclic nucleotide. [8 hrs] DNA Contains the Genetic Information. Used DNA to create proteins. RNA Synthesis. Messenger RNA (mRNA(. Transfer RNA (tRNA).[14hrs] Revision problem classes [3 hrs] <u>Part B – Practical labs</u> Blood composition, Functions of blood .Centrifugation, Anticoagulant, Blood collection and handling, Calorimetric analysis, Spectrophotometer, Light intensity and Beer's law, The normal value. Determination of serum glucose, Insulin, Glucagon . Determination of Growth hormones (GH) and Adrenocortic trophic(ACTH), Hydrocortisone Hormone. Determination of total serum protein concentration, Blood proteins functions, The normal value of serum protein, Hyperproteinemia, Hypoproteinemia. Methods for determination of serum protein concentration. [18 hrs] Determination of serum cholesterol concentration .The source and metabolism of cholesterol as the following. How cholesterol is transported in the blood. The normal value of blood cholesterol. Determination of serum urea concentration. The normal value of blood urea. The removing of urea. Clinical significance of urea. Determination of serum creatinine concentration. The normal value of blood creatinine. Clinical Significance of Creatinine. Natural concentration of creatine. Determination of creatinine concentration in serum. [18 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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	Nucleotides and their synthesis.
Week 2	Synthesis of Nucleotides.
Week 3	Chemistry of purines.
Week 4	Chemistry of pyrimidines.
Week 5	Nucleic acids.
Week 6	Nucleic acids components.
Week 7	Nucleotides Absorb Ultraviolet Light
Week 8	DNA structure, DNA replication
Week 9	protein-synthesizing, Nucleic acids levels.
Week 10	Nucleotides serve divers physiological function
Week 11	Cyclic nucleotide
Week 12	DNA Contains the Genetic Information
Week 13	Used DNA to create proteins
Week 14	RNA Synthesis
Week 15	Messenger RNA (mRNA) Transfer RNA (tRNA)

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

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

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

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	General Bacteriology		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Bio-225		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	2	Semester of Delivery	
Administering Department	Bio	College	COS
Module Leader	Dr. Khansaa Younis Mohammed	e-mail	Kansbio50@uomosul.edu.iq
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Sahar Salim Al-Nakkar Muna Mohammed Essam Ashwaq Hazim	e-mail	saharsalim@uomosul.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	02/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	This study aims to: <ol style="list-style-type: none"> 1. Giving primary information to the student regarding methods of feeding microorganisms. 2. The factors affecting its growth. 3. Methods of controlling it, whether biological, chemical, physical or mechanical. 4. In addition to giving the student preliminary information on the pathogenicity of bacteria. 5. Giving the student preliminary information in immunity. 6. Giving the student preliminary information in Biotechnology.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	From the study of this subject: <ol style="list-style-type: none"> 1. Students were able to learn the cell bacterial cycle. 2. The student should know the most important terms related to the subject. 3. By studying the student's immunity, he was able to understand the human immune system and the mechanisms of his work. 4. Encouraging students to develop their scientific skills in the medical laboratories. 5. Encourage students to discuss various problems about antibacterial drug resistances and how to deal with these bacterial strains. 6. Develops the students own skills to deal with bacterial genetic material . 7. Biotechnology. 8. Studying many methods of sterilization and disinfection. 9. Studying methods of counting bacteria cells (measuring the amount of growth) and conducting experiments on them. 10. Studying the types of culture media, how to prepare them, and identifying ways to isolate and inoculate bacteria. 11. Studying the types of biochemical tests and diagnosing bacteria.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> Nutrition of Microorganisms. Nutritional types of microorganisms. Culture media Microbial Growth Cycle . Bacterial Cell Division .Cell Growth and Binary Fission. Population Growth. Essentials of Catabolism .Influence of environmental factors of growth , Temperature, Acidity and Alkalinity, Osmotic Effects, Oxygen, Pressure, Radiation.[10 hrs] Microbial Growth Control. Physical Antimicrobial Control. Heat Sterilization, Radiation Sterilization, Filter Sterilization. Biological control of microorganisms. The use of mechanical methods in control: Chemical Growth Control, Antimicrobial Agents, General characteristics of antimicrobial drugs, Mechanisms of Antimicrobial Action. Antimicrobial Drug Resistance.[8 hrs] Host – Parasite Relationships, Overview of bacterial pathogenesis, Virulence,

	<p>Toxigenicity, Immunity, Cells and Organs of the Immune System, Innate Immunity, Adaptive Immunity, Antibodies, Inflammation. Prevention of Infectious. Allergy, Hypersensitivity.[10 hrs]</p> <p>Molecular Biology of Bacteria, DNA Structure and Genetic, DNA Replication, RNA Synthesis: Transcription, Protein Structure and Synthesis. Biotechnology. [8 hrs]</p> <p>Revision problem classes [3 hrs]</p> <p><u>Part B – Practical labs</u></p> <p>Sterilization Methods. Part 2. Quantitative measurements of bacterial growth. Turbidity measurements (Spectrophotometer). McFarland’s Tubes. Total (viable) count. Breed’s method, Hemocytometer. Types of culture media and their preparation. Anaerobic culture methods. Kirby-Bauer antimicrobial Sensitivity Test. Influence of environmental factors of growth. Temperature, - Osmotic Effects, - Oxygen. [20 hrs]</p> <p>Identification of bacteria: Biochemical tests: Sugar fermentation test. Basis of biochemical tests. IMViC. Phenylalanine deaminase test, Urease test. Oxidase, Catalase. Gelatin Hydrolysis Test. Nitrate, TSI slope. Starch hydrolysis test. coagulase.[16 hrs]</p>
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	<p>Expanding students' perceptions about this science and its contents. Teaching Techniques: Powerpoint presentations, videos and tutorials. Students do study the following fields: Nutrition of Microorganisms .Bacterial Cell Division. Influence of environmental factors of growth. Microbial Growth Control. Antimicrobial Agents. Overview of bacterial pathogenesis . Immunity. Molecular Biology of Bacteria. Students are trained to perform experiments in bacterial cell counts, preparation and the purpose of many types of culture media, grow anaerobic incubation, antibiotics sensitivity testing, and routine biochemical testing for bacterial identification. Furthermore each lab results for the previous lab work are discussed. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.</p>

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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

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

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Nutrition of Microorganisms . Nutritional types of microorganisms.
Week 2	Culture media Microbial Growth Cycle
Week 3	Bacterial Cell Division Cell Growth and Binary Fission
Week 4	Population Growth Essentials of Catabolism

Week 5	Influence of environmental factors of growth -Temperature - Acidity and Alkalinity - Osmotic Effects
Week 6	- Oxygen - Pressure - Radiation
Week 7	Microbial Growth Control Physical Antimicrobial Control Heat Sterilization Radiation Sterilization Filter Sterilization
Week 8	Biological control of microorganisms The use of mechanical methods in control: Chemical Growth Control
Week 9	Antimicrobial Agents General characteristics of antimicrobial drugs Mechanisms of Antimicrobial Action Antimicrobial Drug Resistance
Week 10	Host – Parasite Relationships Overview of bacterial pathogenesis Virulence Toxigenicity
Week 11	Immunity Cells and Organs of the Immune System Innate Immunity Adaptive Immunity Antibodies
Week 12	Inflammation Prevention of Infectious Allergy, Hypersensitivity
Week 13	Molecular Biology of Bacteria DNA Structure and Genetic DNA Replication
Week 14	RNA Synthesis: Transcription Protein Structure and Synthesis
Week 15	Biotechnology

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Cell Biology		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Bio-311		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	3	Semester of Delivery	
Administering Department	Bio	College	cos
Module Leader	Dr. Hiba Khalid mahmood	e-mail	hebsbio59@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Mowaffaq Khaleel	e-mail	mufsbio62@uomosul.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	02/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	General Zoology	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	This study aims <ol style="list-style-type: none"> 1. Understand the basic concepts of cellular function. 2. The ability to carefully analyze the scientific evidence contained in what is understood about cellular processes. 3. Developing skills by understanding the mechanisms and hypotheses that regulate cell work.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> 1. To enable students to understand the cell biology. 2. Help the student to understand the organelles. 3. Encourage the student to develop their study skills. 4. The students must understand the structures and the types of the cells. 5. The students must learn how the cell divides? 6. The students must know the ways of feeding and drinking of the cells.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> Introduction to cell biology. cell theory. Prokaryotic cells . eukaryotic cells. [8 hrs] Cell membrane structure. Cell membrane function. Cell wall structure. Cell wall function. [10 hrs] Organelles : mitochondria ,plastids .nucleus. Ribosomes , lysosome , centrosome.. golgy complex, ER. [10 hrs] Cell cycle. Mitosis. Meiosis. [8 hrs] Revision problem classes [3 hrs] <u>Part B – Practical labs</u> study the prokaryotic and eukaryotic cells. Measure the length of the cell . Study the cell wall. modification and functions of plasma membrane. Study the cytoplasmic organelles part 1. Study the cytoplasmic organelles part 2. [18 hrs] Study the cell division (mitosis). Study the cell division (meiosis) . Structures of chromosomes..number and types of chromosomes. karyotyping part 1, karyotyping part 2. DNA replication. Gene expression part 1. Gene expression part 2.[18 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

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

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Bickers World of the cell/ eighth edition/Hardin j. and <i>et.a</i>	Yes
Recommended Texts	Human Genetics /seven edition /Ricki lewis	Yes
Websites	https://www.nature.com/scitable/topic/cell-biology-13906536/ https://www.youtube.com/watch?v=URUJD5NEXC8 https://www.sciencedirect.com/book/9780323341264/cell-biology	

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Ecology		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Bio-312		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	3	Semester of Delivery	
Administering Department	Bio	College	COS
Module Leader	Dr. Abdulmoneim Mohammed Ali Kannah	e-mail	abmsbio38@gmail.com
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Mahmood Esmaeel Enas Qusay	e-mail	Mahmoodaljubory76@gmail.com
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	02/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	This study aims <ol style="list-style-type: none"> 1. Provide the student with aspects of knowledge of the concepts, types and characteristics of environmental systems. 2. Providing the student with knowledge that enables him to identify the importance of environmental systems and the problems they face. 3. Enable the student to choose environmental models and use them in the study of environmental systems . 4. Providing students with positive attitudes towards preserving and protecting environmental systems . 5. Provide students with positive attitudes towards preserving and protecting environmental systems . 6. Enable the student to choose environmental models and use them in the study of environmental systems. 7. Providing students with aspects of knowledge of the concepts, types and characteristics of environmental systems. 8. The student acquires practical and applied skills based on theoretical lessons.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> 1. Every student be able to knowledge about environment and how pollution it. 2. Every student be able to chemical analysis water. 3. The student should be able to collect and summarize useful information related to a study. 4. The student proposes solutions to some environmental problems within the framework of protecting and preserving them. 5 . That the student has the ability to work in a team.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> Introduction; Definition; Scope; Divisions. The Ecosystems (definition, characters, volume, structure). Food chains & food webs. Ecological pyramids & Energy flow; Ecological efficiency. The biogeochemical cycles. Incomplete ecosystems . [10 hrs] Liebig law of minimum; Shelford law of tolerance. The abiotic factors:1-The Soil . 2-The water .The components of natural water (anions, cations, salts). 2-The water .The components of natural water (gases & organic matters(. Characters of the population.[10 hrs] The biological interactions. The communities (principals of bio-communities, Concept,. classification, dominancy, stratification.(Ecological succession. Biogeography; the major distributions of plants & animals. [8 hrs] Revision problem classes [3 hrs] <u>Part B – Practical labs</u>

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

استراتيجيات التعلم والتعليم

Strategies	<p>Expanding students' perceptions about this science and its contents . Various techniques were used such as. Data show , Microscope, Posters . Student were active in our classes and interactive between them and us also. Teaching Techniques were Variety. Students do study the following fields: Introduction of ecology. Divisions of ecology. Ecosystems . Nutritional Relationships. Food Chains & Food Webs. Ecological pyramid. Environmental Productivity. Introduction of Lab. ecology .Safety in the laboratory. Identify biotic and abiotic environmental factors. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.</p>
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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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

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

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

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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

Learning and Teaching Resources

مصادر التعلم والتدريس

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

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Histology		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Bio-313		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	3	Semester of Delivery	
Administering Department	Bio	College	COS
Module Leader	Dr. Fatima Qasim Mohammed	e-mail	fatsbio25@uomosul.edu.iq
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Ilham Abd Allah Ali Al-saleem	e-mail	elham_alsaleem@yahoo.com
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	02/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	General Zoology	Semester	1
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Objectives أهداف المادة الدراسية</p>	<p>This study aims</p> <ol style="list-style-type: none"> 1 . Clarify the terms related to tissues for students. 2 . Explain the main types of tissues. 3 . Study its composition. 4 . Study their functions. 5 . distinguish them from each other. 6 . Identify the location of each tissue in the different organs of the body. <p>Keeping pace with the development in the world of histology.</p>
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> 1.The students could recognize the different tissue of each type 2. The students They were able to diagnose all layers of the same tissue and identify the types of cells in them 3. They could distinguish any slide of the basic tissue
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Part A – Theoretical lectures</u></p> <p>Introduction in Histology , The cell . Epithelial Tissue .The types of epithelial tissue The simple epithelial tissue. Modification in surfaces of epithelial tissues Glandular epithelial tissue. Connective Tissue Matrix of C.T and repair it.[14 hrs]</p> <p>The types of connective tissue. Dense connective tissue. Cartilage. The bone (bone cells,The bone types and matrix). The bone histogenesis and repair it. Joints . The blood and its components Blood and Lymph forming organs Non-granular leukocytes, Blood Platlets. Haemopoiesis , Bone marrow.. [10 hrs]</p> <p>Muscular tissues, actin, myosin ,Myofilaments. Sarcoplasmic reticulum, Myoneural junction. Cardiac muscles,Smooth muscles . Nervous tissues,neurons. Peripheral nerves. Types of nerve fibers, Neuroglia, Ganglia. [14 hrs]</p> <p>Revision problem classes [3 hrs]</p> <p><u>Part B – Practical labs</u></p> <p>The simple epithelial tissue part 1. The simple epithelial tissue part 2. Stratified epithelial tissue part 1. Stratified epithelial tissue part 2. Connective tissue(Cells, Fibers). Connective tissue (Loose C. T.). Dense connective tissue. Blood. [18 hrs]</p> <p>Cartilage. Bone. Muscular tissue. Nerve system: the type of nerve cells. Peripheral nerve, motor end plate. nerve fiber ,spinal. Sympathetic ganglia.Cerebellum.. [18 hrs]</p>

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Introduction in Histology , The cell.
Week 2	Epithelial Tissue .The types of epithelial tissue The simple epithelial tissue. Modification in surfaces of epithelial tissues
Week 3	Glandular epithelial tissue. Connective Tissue Matrix of C.T and repair it.
Week 4	The types of connective tissue.
Week 5	Dense connective tissue .
Week 6	Cartilage. The bone (bone cells,The bone types and matrix)
Week 7	The bone histogenesis and repair it. Joints.
Week 8	The blood and its components Blood and Lymph forming organs
Week 9	Non-granular leukocytes, Blood Platlets.
Week 10	Haemopoiesis , Bone marrow.
Week 11	Muscular tissues,actin, myosin Myofilaments .
Week 12	Sarcoplasmic reticulum, Myoneural junction.
Week 13	Cardiac muscles,Smooth muscles.
Week 14	Nervous tissues,neurons. Peripheral nerves.
Week 15	Types of nerve fibers, Neuroglia,Ganglia.

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: The simple epithelial tissue part 1.
Week 2	Lab 2: The simple epithelial tissue part 2.
Week 3	Lab 3: Stratified epithelial tissue part 1.
Week 4	Lab 4: Stratified epithelial tissue part 2.
Week 5	Lab 5: Connective tissue(Cells, Fibers).
Week 6	Lab 6: Connective tissue (Loose C. T.).

Week 7	Lab 7: Dense connective tissue .
Week 8	Lab 8: Blood.
Week 9	Lab9: Cartilage .
Week10	Lab 10: Bone.
Week 11	Lab 11: Muscular tissue .
Week 12	Lab 12: Nerve system: the type of nerve cells.
Week 13	Lab 13: Peripheral nerve, motor end plate .
Week 14	Lab 14: nerve fiber ,spinal.
Week 15	Lab 15: Sympathetic ganglia.Cerebellum.

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

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Mycology		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Bio-314		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	3	Semester of Delivery	
Administering Department	Bio	College	COS
Module Leader	Maha Akram Mohammed Ali	e-mail	mahaalrejaboo2@uomosul.edu.iq
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Hadeel Ahmad Dr. Ali Abd	e-mail	hadsbio43@uomosul.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	02/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Objectives أهداف المادة الدراسية</p>	<p>This study aims</p> <ol style="list-style-type: none"> 1. Communicate information about fungi. 2. Sexual and non-sexual growth and reproduction. 3. How fungi are classified. 4. The role of fungi in nature. 5. Its beneficial effects. 6. Production of vitamins and antibiotics and their role in the food industry. 7. The harmful effects of fungi and their types that cause diseases. 8. Mycotoxins are dangerous to health. 9. Keeping up with the development that is happening in the world of laboratory materials and equipment.
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> 1. Identify fungi. 2. Recognition between useful fungi and their damage . 3. Getting good ways to storage of food . 4. General description of fungi . 5. Classification systems Classification of fungi . 6. The economic importance of fungi. 7. Modern methods of diagnosing fungus.
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Part A – Theoretical lectures</u></p> <p>I Introduction of fungi. History of mycology. Defined fungi. The fungal cell components part 1. The fungal cell components part 2[10 hrs]</p> <p>. Types of fungal septa. The hyphal haustoria Growth and elongation of the hyphal top. The life cycle of fungi , (Nuclear cycles(Reproduction of fungi ,part 1 Reproduction of fungi ,part 2[8 hrs]</p> <p>Nutrition in fungi part 1 . Nutrition in fungi part 2. Metabolism. [10 hrs]</p> <p>Mycotoxins definition .Classification of fungi [8 hrs]</p> <p>Revision problem classes [3 hrs]</p> <p><u>Part B – Practical labs</u></p> <p>Sterilization. The culture media. Isolation of microorganism from different sources: from air Isolation of microorganism from different sources: from water. Isolation of microorganism from soil . Growth of Fungi. Single Spore Isolation for Fungi . Slide culture technique. Collection of medical specimens: laboratory diagnosis of medical fungi . How to maintain or preserve isolated colonies .Methods used to sterilize antibiotics and heat-sensitive compounds . [20 hrs]</p> <p>Identification of common fungi. Identification of Candida by Analytic Profile Index (API 20C Aux:(Identification of pathogenic fungus by Analytic Profile Index (API 20C Aux:(Identification of Candida species by Polymerase Chain Reaction (PCR). [16 hrs]</p>

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

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

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1:. Sterilization .
Week 2	Lab 2: The culture media .
Week 3	Lab 3: Isolation of microorgrnism from different sources: from air
Week 4	Lab 4: Isolation of microorgrnism from different sources: from water .
Week 5	Lab 5: Isolation of microorgrnism from soil.
Week 6	Lab 6: Growth of Fungi.
Week 7	Lab 7: Single Spore Isolation for Fungi .
Week 8	Lab 8: Slide culture technique.
Week 9	Lab9: Collection of medical specimens: laboratory diagnosis of medical fungi.

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

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

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Plant Physiology		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Bio-315		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	3	Semester of Delivery	
Administering Department	Bio	College	COS
Module Leader	Dr. Sajida Aziz Abood	e-mail	sajsbio4@uomosul.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Nihal E. Al-Tae Dr. Wasan Salih Hussain	e-mail	Nehsbio34@uomosul.edu.iq wassbio54@uomosul.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	02/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	This study aims <ol style="list-style-type: none"> 1. Definition of physiology. 2. Studying plant cell structure and function of different cellular organelles. 3. Study of water relations. 4. Study the importance of mineral elements for plants. 5. Brief study of structural and catabolic metabolism.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> 1. He prepares samples of plant tissue to study the plant cell under a microscope. 2. Study the properties of water. 3. And how to prepare solutions and study the phenomenon of diffusion, osmosis and plasma. 4. Prepare experiments to study how water and nutrients move. 5. Discusses how each plant organ performs its different functions. 6. The relationship of each part of the plant to the other. 7. Explain the different ways of absorbing and transporting water in plants. 8. And how plants sweat differentiate between plant needs of mineral elements. 9. That the student be able to understand the different parts of the plant body and their relationship to the concept of physiology. 10. Realizing the importance of water and distinguishing between the mechanism of uptake, transport and loss of water from plants. 11. The ability to understand the mechanism of absorption of nutrients.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> I Introduction to plant physiology. Solutions Types. ◊ Solutions : properties. Solutions : Preparation. Plant Water relations. properties of water and its importance. [10 hrs] Diffusion, define, factors affecting on diffusion, importance. Imbibition, Conditions necessary for imbibition, Factors affecting on imbibition, Importance of imbibition [8 hrs] Osmosis ,Conditions in Osmosis Water potential. components of water potential. Permeability, types of membrans, General rules of permeability. Importance of permeability Water potential and their components. [10 hrs] Translocation, Pathway of water transport. Transpiration (types, mechanism ◊ theory, Guttation, Bleeding, [8 hrs] Revision problem classes [3 hrs] <u>Part B – Practical labs</u>

	<p>Study of Osmosis. Permeability. Permeability, define,factors affecting, rules for permeability, importance Osmosis, Conditions in Osmosis Water potential, components of water potential. Ways of solutes entry and transport through the plant cells membranes,simple and Facilitated diffusion, active transport . Transpiration.Types of transpiration Stomata, Structure of stomata, Number of Stomata (Stomatal Frequency). [18 hrs]</p> <p>Mechanism of transpiration, Stomatal movement, Role of transpiration. Phytohormones are chemical messengers that coordinate cellular activities. This lecture introduces the plant hormones (auxin, cytokinin, gibberellic acid, brassinosteroids, ethylene, abscisic acid, salicylic acid and jasmonic acid) through their roles, during the plants life, from seed-to-seed.Photosynthesis is the process by which plants use sunlight, water, and carbon dioxide to create oxygen and energy in the form of sugar. [18 hrs]</p>
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	<p>Expanding students' perceptions about this science and its contents .Students do study the following fields: Solution, Types(True,colloidal,suspension,Eumlsion) . Colloidal systems, properties, Buffer solution. Plant water relationship,properties of water,Diffusion,define,factors affecting on diffusion, importance . Imbibition, define,factors affecting, Conditions necessary for imbibition, importance . Permeability, define,factors affecting, rules for permeability, importance Osmosis, Conditions in Osmosis Water potential, components of water potential. Ways of solutes entry and transport through the plant cells membranes,simple and Facilitated diffusion, active transport Relationship between plants and environment, Absorption of water and solutes by plants roots, Factors affecting water absorption by root . Water and minerals transport in plant(Translocation), Pathway of water transport Mechanisms (theory) of water and its solute transport, Root pressure, Transpiration pulls, Cohesion-Adhesion theory, Guttation, Bleeding . Transpiration.Types of transpiration Stomata, Structure of stomata, Number of Stomata (Stomatal Frequency). Mechanism of transpiration, Stomatal movement, Role of transpiration. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.</p>

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

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

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction to plant physiology
Week 2	Solutions Types, .
Week 3	Solutions : properties.
Week 4	Solutions : Preparation.
Week 5	Plant Water relations.
Week 6	properties of water and its importance.

Week 7	Diffusion, define, factors affecting on diffusion, importance .
Week 8	Imbibition, Conditions necessary for imbibition, Factors affecting on imbibition, Importance of imbibition
Week 9	Osmosis ,Conditions in Osmosis Water potential.
Week 10	components of water potential.
Week 11	Permeability, types of membranes, General rules of permeability. Importance of permeability
Week 12	Water potential and their components.
Week 13	Translocation, Pathway of water transport.
Week 14	Transpiration (types, mechanism,
Week 15	theory, Guttation, Bleeding,

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Study of Osmosis part 1.
Week 2	Lab 2: Study of Osmosis part 2.
Week 3	Lab 3: Permeability part 1.
Week 4	Lab 4: Permeability part 2.
Week 5	Lab 5: Transpiration part 1.
Week 6	Lab 6: Transpiration part 2.
Week 7	Lab 7: Respiration part 1.
Week 8	Lab 8: Respiration part 2.
Week 9	Lab 9: Dormancy part 1.
Week 10	Lab 10: Dormancy part 2.
Week 11	Lab 11: Phytohormones part 1.
Week 12	Lab 12: Phytohormones part 2.
Week 13	Lab 13: Photosynthesis part 1.
Week 14	Lab 14: Photosynthesis part 2.
Week 15	Lab 15: Photosynthesis part 3.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Duca M.(2015) Plant Physiology	Yes
	Bhatla S.C.and Lal M.A.(2018) Plant Physiology,Development and Metabolism .	Yes
	Plant Physiology(2011). edited by Philip Stewart, Sabine Globig	Yes
Recommended Texts	Practical Plant Physiology(2021) Frederick Keeble, M. C. Rayner	Yes
Websites	https://academic.oup.com/plphys https://www.sciencedirect.com/topics/medicine-and-dentistry/plant-physiology	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
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	F – Fail	راسب	(0-44)	Considerable amount of work required
<p>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.</p>				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Immunology		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Bio-316		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	3	Semester of Delivery	
Administering Department	Bio	College	COS
Module Leader	Dr. Hiyam Adil Al-Taii	e-mail	hiyamaltai@uomosul.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Rojan Ghanim Mohammed	e-mail	rojsbio57@uomosul.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	02/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Objectives أهداف المادة الدراسية</p>	<p>This study aims</p> <ol style="list-style-type: none">1. The student understood the basic concepts of immunology, the components of the immune system, its organs, cells, molecules and functions.2. Learn about the mechanisms of immune response reactions, how they are regulated, and classify immune diseases3. Learn about the importance of antibodies, their structure, types of antibodies, and the mechanism of interaction between antigens and antibodies.4. Helping the student to understand how the immune system works in the normal physiological state and in the case of disease5. Knowledge and understanding of clinical disorders associated with autoimmune diseases6. The student understands the basic concepts of immunology, the components of the immune system, its organs, cells, molecules and functions7. Learn about the mechanisms of immune response reactions, how they are regulated, and classify immune diseases8. Learn about the importance of antibodies, their structure, the diversity of antibodies, and the mechanism of interaction between antigens and antibodies9. Helping the student to understand how the immune system works in the normal physiological state and in the case of disease10. Understanding the immunological basis for rejection of transplanted organs and the medical examinations required before organ transplantation11. Knowledge and understanding of clinical disorders associated with autoimmune diseases12. Learn about the mechanisms of immune response reactions, how they are regulated, and classify immune diseases
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none">1. Understand how the immune system is used in prevention and treatment.2. Learn about some laboratory immunological tests that are used in practice to detect the interactions of antibodies with antigens.3. Familiarity with the importance of vaccinations.4. The student's ability to distinguish between normal and abnormal immune response mechanisms.5. The student realizes the impact of the surrounding environment, psychological state, and advanced age on the immune system and the increase in the incidence of cancerous tumors.6. Introducing the importance of the basics of immunology and its relationship to other branches of science.7. Study of the structure and anatomical description of the immune system, primary lymphoid tissue, secondary lymphoid tissue, bone marrow stem cells.

Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> Introduction in Immunology. Innate immune response-1 . Complement ,phagocytosis. Primary Lymphoid organ. Secondary Lymphoid organ .Cell-1- .Cell-2-.[14hrs] Cell-mediated immune response. T-Cell .Immunoglobulins-1 .Immunoglobulins-2.[14hrs] Antigen. Immunogen..MHC-I .MHC-II. Immunodiseases. [18 hrs] Revision problem classes [3 hrs] <u>Part B – Practical labs</u> CBC test. Differential WBC. Phagocytosis. Complement. Injection of Lab animals. Agglutination and perception reaction. [18 hrs] ELISA-1. ELISA -2. Immunofluorescence-1. - Immunofluorescence-2- E-rosette-1. E-rosette-2. Hypersensitivity. Lymphoblast transformation test. Flow cytometry. [18 hrs
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents . Various techniques were used such as. Data show , Microscope, Posters, serological methods and immunological kits. Students' behavior is highly professional in class. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

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

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

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

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

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Genetics		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Bio-321		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	3	Semester of Delivery	
Administering Department	Bio	College	COS
Module Leader	Dr. Hiba Khalid mahmood	e-mail	hebsbio59@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Mowaffaq Khaleel	e-mail	mufsbio62@uomosul.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	02/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Objectives أهداف المادة الدراسية</p>	<p>This study aims</p> <ol style="list-style-type: none"> 1. Introduce the student to the science of genetics, its branches, and its importance. 2. Introducing the student to the science of genetics, its branches, and its importance. 3. Introduce the student to the cytological structure of the plant cell, with a focus on the cell nucleus, its genetic components and functions. 4. Knowledge of Mendel laws and their applications. 5. The student is familiar with the identification of genetic factors and the extent of their influence genetically. 6. Giving the student the necessary experience and skills in the field of basics of genetics in general.
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> 1. To enable students to understand the genetics 2. Help the student to understand the law of genetics 3. Encourage the student to develop their study skills. 4. The students must know the traits of pea plant studied by Mendel. 5. The students must understand the solution method of genetic problem. 6. The students must learn the genetic disease.
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Part A – Theoretical lectures</u></p> <p>Introduction in Genetics. Basic Genetics , Genetic Terminology. The Physical Basis of Heredity. Effects of the Environment on genetics. [10 hrs]</p> <p>Mendel's Studies. allelic relationship. Determination of Sex. sex- linked inheritance. [8 hrs]</p> <p>Cytogenetic : Changes I Structure of Chromosomes. Changes in Chromosomes Number. [10 hrs]</p> <p>Gene mutation. Genes in Individuals. Linkage. Crossing Over. Mapping of Chromosomes. [8 hrs]</p> <p>Revision problem classes [3 hrs]</p> <p><u>Part B – Practical labs</u></p> <p>The characters of the best organism for the genetic studies. The traits of pea plant. Mendels first law and solution of genetic problems. Mendels second law and solution of genetic problems. Punnet squares and solution of genetic problems. Part 1 Punnet squares and solution of genetic problems. part 2 . Mendel's characters in human, solution of genetic problems. the characters link with sex, solution of genetic problems. [18 hrs]</p> <p>Pedigree analysis, solution of genetic problems. Forked line method. solution of genetic problems. Diagnosis of genetic disease. solution of genetic problems. The corn plant Drosophila. [18 hrs]</p>

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

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

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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

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

Learning and Teaching Resources

مصادر التعلم والتدريس

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

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Pollution		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Bio-322		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	3	Semester of Delivery	
Administering Department	Bio	College	cos
Module Leader	Dr. Abdulmoneim Mohammed Ali Kannah	e-mail	abmsbio38@gmail.com
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Mahmood Esmaeel Enas Qusay	e-mail	Mahmoodaljubory76@gmail.com
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	02/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Objectives أهداف المادة الدراسية</p>	<p>This study aims</p> <ol style="list-style-type: none"> 1. The student's knowledge of the concept of pollution, its causes, types, risks, and how to reduce pollution. 2. Knowing the negative effects of pollutants on the environment and human health. 3. Identify the harmful effects of pesticides, fertilizers, oil and others. 4. Identify solid waste, its types, damages, and disposal methods. 5. Identify the types of radiation and radioactive pollution, its sources and its biological damage. 6. Learn about the concept of the ecosystem and its components. 7. Introducing the concept of environmental pollution and the factors contributing to it. 8. Clarify the dangers and consequences of environmental pollution.
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> 1. How to deal with any environmental problem and control the problem within the limits of capabilities. 2. Understanding and distinguishing the types of factors and substances that contribute to the pollution of the ecosystem. 3. Every student be able to knowledge about environment and how pollution it. 4. Every student be able to chemical analysis water. 5. The student should be able to collect and summarize useful information related to a study. 6. The student proposes solutions to some environmental problems within the framework of protecting and preserving them. 7 . That the student has the ability to work in a team.
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Part A – Theoretical lectures</u></p> <p>General introduction; definition. pollution types .Point sources & non-point sources of pollution . Water pollution . Major pollutant. [16 hrs]</p> <p>Major pollutant: The hydrocarbons Agricultural pollution. The solid waste. Thermal pollution. Air pollution .[10 hrs]</p> <p>The greenhouse phenomenon. Acid rains. Thermal inversion. Noise pollution. Radiation pollution. Personal pollution. Visual Pollution. [12 hrs]</p> <p>Revision problem classes [3 hrs]</p> <p><u>Part B – Practical labs</u></p> <p>Identifying the laboratory pollution. The Science of meteorological. Determination residual chlorine in the water. Determination chloride in the water. Determination</p>

	<p>BOD5 in the water. Determination COD. In the water. Determination nitrate in the water. [18 hrs]</p> <p>Determination phosphate in the water. Determination Sulphate in the water. Determination silica in the water. Relations between organisms. Field capacity of soil . Soil color. Soil Texture. Determination heavy metal in the water,1. Determination heavy metal in the water,2.. [18 hrs]</p>
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	<p>Expanding students' perceptions about this science and its contents Students do study the following fields: Introduction of pollution. Types of pollution. The pollutants. Water Pollution. Soil Pollution. Noise Pollution. Introduction of Lab pollution. Identify the types of water pollutants. Able to physical and chemical analysis for water. Most students were active in our classes and interactive between them and us also. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.</p>
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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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

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

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Identifying the laboratory pollution.
Week 2	Lab 2: The Science of meteorological.
Week 3	Lab 3: Determination residual chlorine in the water.
Week 4	Lab 4: Determination chloride in the water.
Week 5	Lab 5: Determination BOD ₅ in the water.
Week 6	Lab 6: Determination COD. In the water.
Week 7	Lab 7: Determination nitrate in the water.
Week 8	Lab 8: Determination phosphate in the water.

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

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

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Animal Physiology		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Bio-323		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	3	Semester of Delivery	
Administering Department	Bio	College	COS
Module Leader	Dr. Muntaha Mahmood	e-mail	muntsbio17@uomosul.edu.iq
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Abeer Attaala Aeed	e-mail	abesbio53@uomosul.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	02/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Objectives أهداف المادة الدراسية</p>	<p>This study aims</p> <ol style="list-style-type: none"> 1. The student's comprehension of the concept of the course and his ability to distinguish between it and other sciences. 2. Addressing a comprehensive description of the various body systems, with a focus on ruminant field animals and poultry. 3. Studying the vital processes that occur in the animal's body that transform the nutrients that the animal eats and turn them into animal products or other secondary waste. 4. Basic and physiology of growth and reproduction. 5. Keep up with the development that is happening in the world
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> 1. The students understand different physiological mechanisms in the body. 2. Help the students to master the interaction and relationships between body systems. 3. The development of student's skills for going into relationship between the physiological and pathological disorders. 4. The students understand mode of action each physiological test. 5. Help the students to master the procedure of each physiological test. 6. The development of student's skills for going into the laboratory work experience as specialist who has an excellent background on all physiological tests and their relationship to disease and not as technician operating advice.
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Part A – Theoretical lectures</u></p> <p>Introduction to Physiology. Cell physiology. The mechanisms of transports across the cell membrane. Phagocytosis mechanism. Pinocytosis mechanism. [10 hrs]</p> <p>Blood physiology. Physical Characteristics of blood. Plasma, Erythrocytes, Erythropoiesis. erythrocyte disorders. Types of anemia. Leukocytes. Functions of all types of Leukocytes. Platelets, Hemostasis mechanism, Fibrinolysis.[18hrs]</p> <p>Physiology of Digestion system. Functions of the Digestive System. Nervous Regulation of the Digestive System. Function of Stomach. Regulation of Gastric Secretion. Pancreas. Gall Bladder. Small Intestine. Large intestine [18hrs]</p> <p>Revision problem classes [3 hrs]</p> <p><u>Part B – Practical labs</u></p> <p>General safety instructions in the laboratory. Introduction Circulatory system. Fragility test 1. Fragility test 2. Total Red Blood Cell count. differential count. Estimation Hemoglobin. [18 hrs]</p> <p>PCV test. Platelets count. : ESR test. Bleeding time Test. Blood pressure. Physiological and pathological variation of Blood pressure. Blood groups. Respiratory test.[18 hrs]</p>

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

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

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

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

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Fungal Taxonomy		Module Delivery	
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code	Bio-324			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	3	Semester of Delivery		6
Administering Department	Bio	College	cos	
Module Leader	Dr. Fatin Nuri Abd		e-mail	fatinnuri@uomosul.edu.iq
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Warka Saeed Kasim		e-mail	warsbio22@uomosul.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail	
Scientific Committee Approval Date	02/06/2023	Version Number	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Objectives أهداف المادة الدراسية</p>	<p>This study aims to</p> <ol style="list-style-type: none"> 1. Identify the fungal and their kinds . 2. Identify the differences in life cycle between fungal divisions 3. The benefits and the damage of fungi . 4. Identify the diseases caused by various genus of fungi .
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> 1. Know the types of fungi in different environments. 2. Distinguish between filamentous fungi and unicellular fungi. 3. How to identify and diagnose fungus. 4. Familiarity with the techniques used to benefit from fungi.
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Part A – Theoretical lectures</u></p> <p>I Fungal taxonomy , modern taxonomy . Classification of Fungi. kingdom: Protozoa ,key to phyla of fungi. Myxomycota , Protozoa-Plasmodiophoromycota. Kingdom Straminipila . Oomycota. kingdom: Eumycota -Chytridiomycota. kingdom: Eumycota - Zygomycota Order:Mucorales – Entomophthorales، [10 hrs]</p> <p>The importance of ascomycetes—Ascomycota classification-sexual reproduction and development Sub-Class:-Hemiascomycetidae . Sub-class:Plectomycetes. Su Class :- Hymenoascomycetes ، Series: Pyrenomycetes , Order Erysiphales. [8 hrs]</p> <p>Order: clavicipitales life: Claviceps purpureae Order:Pezizales, Sub- class: loculoascomycetidae .Sub-class:Laboulbeniomycetidae. [10 hrs]</p> <p>Phylum. Basidiomycota. Sub-class:Holobasidiomycetidae. Series:Gasteromycetes . Sub-class:Phragmobasidiomycetidae. [8 hrs]</p> <p>Revision problem classes [3 hrs]</p> <p><u>Part B – Practical labs</u></p> <p>Introduction to classification of fungi. Kingdom: Stramenopila 1. Kingdom: Stramenopila 2. Kingdom: Stramenopila 3. Kingdom: Eumycota Phylum: Chytridiomycota . Zygomycota . Kingdom: Eumycota Phylum: Chytridiomycota Zygomycota . Phylum: Ascomycota. Plectomycetes. [18 hrs]</p> <p>Phylum: Ascomycota. Plectomycetes. Class: Hymenoascomycetes. Clavicipitales Class: Hymenoascomycetes. Order: Clavicipitales. Order: Erysiphales . Order: Pezizales. Order: Erysiphales. Pezizales. Class: Loculoascomycetes. Basidiomycetes 1 .. Basidiomycetes2.[18 hrs]</p>

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	<p>Expanding students' perceptions about this science and its contents Students do study the following fields: Identify the fungal and their kinds . Identify the differences in life cycle between fungal divisions . The benefits and the damage of fungi . Identify the diseases caused by various genus of fungi . Classification of fungi to 3 kingdoms. This course provides an introduction to the taxonomy of fungi; Classification is a way to describe the relatedness of organisms. The classification of fungi has traditionally been based on gross morphology, development, and physiology of the organism. Although sequences of DNA and protein provide better information about the relatedness of two species, the more traditional approach to classification will serve as our system to indicate the relationships among fungi we observe in lab. The 3-Kingdom classification will be used and we will consider the following phyla of fungi which contain organisms traditionally classified as fungi. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.</p>
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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	Fungal taxonomy , modern taxonomy .
Week 2	Classification of Fungi.
Week 3	kingdom: Protozoa ,key to phyla of fungi .
Week 4	Myxomycota , Protozoa-Plasmodiophoromycota.
Week 5	kingdom: Straminipila . Oomycota .
Week 6	kingdom: Eumycota -Chytridiomycota .
Week 7	kingdom: Eumycota - Zygomycota Order:Mucorales – Entomophthorales ,
Week 8	The importance of ascomycetes—Ascomycota classification-sexual reproduction and development
Week 9	Sub-Class:-Hemiascomycetidae .
Week 10	Sub-class:Plectomycetes .
Week 11	Sub-Class :-Hymenoascomycetes, Series: Pyrenomycetes , Order Erysiphales .
Week 12	Order: clavicipitales life: <i>Claviceps purpureae</i> Order:Pezizales, Sub- class: -loculoascomycetidae.
Week 13	Sub-class:Laboulbeniomycetidae. Phylum.: Basidiomycota.
Week 14	Sub-class:Holobasidiomycetidae. Series:Gasteromycetes .
Week 15	Sub-class:Phragmobasidiomycetidae.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to classification of fungi
Week 2	Lab 2: Kingdom: Stramenopila 1.
Week 3	Lab 3: Kingdom: Stramenopila 2.
Week 4	Lab 4: Kingdom: Stramenopila 3.
Week 5	Lab 5: Kingdom: Eumycota Phylum: Chytridiomycota Phylum: Zygomycota
Week 6	Lab 6: Kingdom: Eumycota Phylum: Chytridiomycota

	Phylum: Zygomycota
Week 7	Lab 7: Phylum: Ascomycota Class: Plectomycetes
Week 8	Lab 8: Phylum: Ascomycota Class: Plectomycetes
Week 9	Lab 9: Class: Hymenoascomycetes Order: Clavicipitales
Week10	Lab 10: Class: Hymenoascomycetes Order: Clavicipitales
Week 11	Lab 11: Order: Erysiphales Order: Pezizales
Week 12	Lab 12: Order: Erysiphales Order: Pezizales
Week 13	Lab 13: Class: Loculoascomycetes
Week 14	Lab 14: Basidiomycetes 1.
Week 15	Lab 15: Basidiomycetes2.

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

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Aquatic and Soil Microbiology		Module Delivery	
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code	Bio-325			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	3	Semester of Delivery		6
Administering Department	Bio	College	COS	
Module Leader	Dr. Rayan Mazin		e-mail	rayanmazin@uomosul.edu.iq
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Aws Ibrahim Sulaiman		e-mail	awssbio61@uomosul.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail	
Scientific Committee Approval Date	02/06/2023	Version Number	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Objectives أهداف المادة الدراسية</p>	<p>This study aims</p> <ol style="list-style-type: none"> 1. Know the concepts of water and soil microbiology. 2. Studying the economic and environmental importance of water and soil microbes. 3. Knowing the effect of microorganisms on the environment and the interactive effect with higher organisms. 4. Studying the role of soil organisms in the formation and erosion of soil and the cycle of carbon and nitrogen. 5. Discuss the vital relationships of water and soil microbes.
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> 1. Every student be able to isolation and identification microorganisms from several habitats. 2. Every student have a knowledge about the effect of microorganisms on public health. 3. Detect the water quality for sanitary using several practical techniques (MPN, MFT, Colilert system, etc.) 4. By studying the student, he was able to understand the scientific subject 5. Helping the student to master the conduct of scientific experiments and tests for the subject 6. Encouraging him to develop his scientific skills.
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Part A – Theoretical lectures</u></p> <p>I Introduction of water and Soil . properties of soil layers. Distribution of microorganisms¹ in soil. Bacteria in soil. Virus in soil, Algae in soil. Parasite in soil. [10 hrs]</p> <p>Soil borne pathogens¹ Minerals cycle 1 (Carbon(Minerals Cycle 2 (Nitrogen(. Bioremediation. [8 hrs]</p> <p>Water Is the Largest Microbial Habitat Aquatic Viruses: Mortality at Sea Algae: the major microbial biomass in freshwater systems Water Borne Pathogens (Virus, Parasites and Fungi.[10 hrs]</p> <p>Water Borne Pathogens (Bacteria(Water Quality and Public Health. Wastewater Treatment [8 hrs]</p> <p>Revision problem classes [3 hrs]</p> <p><u>Part B – Practical labs</u></p> <p>Introduction in practical water & Soil Microbiology. Contact slide assay . microbial population count in water & soil. Bacteria and Actinomycetes . Fungi. Isolation of antibiotic producer from soil. measuring CO₂ production. Algae enumeration. filament Fungi.. [18 hrs]</p> <p>Bacteriological examination of water, Coliform bacteria + E.coli.. Fecal Enterococcus. isolation the Shigella. isolation the Salmonella. isolation Vibrio cholera. isolation Pseudomonas . [18 hrs]</p>

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

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

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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

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

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

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Microbial Physiology		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Bio-326		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	3	Semester of Delivery	
Administering Department	Bio	College	COS
Module Leader	Dr Essra Ghanim Hazim Alsammak	e-mail	esrsbio19@uomosul.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr Enas Abdul Munieem Al-Layla	e-mail	inasamuneem@uomosul.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	02/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Objectives أهداف المادة الدراسية</p>	<p>This study aims</p> <ol style="list-style-type: none"> 1. Convey information to the student about the latest information on bacterial physiology. 2. The importance of the factors affecting its growth. 3 . Microstructure of a microbial c
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> 1.the student know the bacterial structure . 2.the function of each structure . 3. how culture and study the feature of bacteria. 4.The Students understood what is microbial growth curve 5. The students were perfect in Detection of bacterial enzyme 6. Try to improve their skills in Antimicrobial sensitivity test.
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Part A – Theoretical lectures</u></p> <p>Define bacteria physiology and bacterial structure (The shape and size of bacteria. (Cell wall structure and function of gram positive and gram negative bacteria & Atypical cell wall include Archaea. . [10 hrs]</p> <p>The structure out of the cell wall (Glycocalyx , s-layer, Pili and Fimbriae, flagella) chemotaxis. Cytoplasmic membrane function & structure for bacteria and Archaea. Cytoplasmic structure ,Nuclear area, inclusion bodes . Plasmid , ribosomes ,Spores structure. [8 hrs]</p> <p>Nutrition macro& micronutrients, growth factor. Uptake of Nutrients by The Cell. Reproduction of bacterial cells. Protein Secretion system. Cellular Energy, Free Energy. Enzymes.[10 hrs]</p> <p>.Respiratory Metabolism (Autotrophic & Heterotrophic Metabolism(. Glycolytic Pathways. Archaeobacterial Glycolytic Pathways. Lipid Catabolism, Protein Catabolism. Tri carboxylic acid cycle (TCA Cycle). Oxidative Phosphorylation Fermentation. Oxygenic & An oxygenic Photosynthesis [8 hrs]</p> <p>Revision problem classes [3 hrs]</p> <p><u>Part B – Practical labs</u></p> <p>Introductin, Microbial growth curve and Mathmatics. Microbial growth factors Detection of bacterial enzyme1. Detection of bacterial enzyme2. Detection of bacterial enzyme3. Detection of bacterial enzyme4. [18 hrs]</p> <p>Bacterial toxins1. Bacterial toxins2. Oxidation Reduction Reactions. Detection of fermentation metabolisims1. Detection of fermentation metabolisims2. Antimicrobial sensitivity tests 1. Antimicrobial sensitivity tests 2. API. VITEK. [18 hrs]</p>

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

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

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

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

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

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	Molecular Biology		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Bio-411		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	4	Semester of Delivery	
Administering Department	Bio	College	COS
Module Leader	Dr. Sarab Daoud Sulayman	e-mail	sarsbio14@uomosul.edu.iq
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Sahar Luqman Dr. Sahira Adrees	e-mail	sahira.scp5@student.uomosul.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	02/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Genetics	Semester	6
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Objectives أهداف المادة الدراسية</p>	<p>This study aims</p> <ol style="list-style-type: none"> 1. Understand the principles of biology at the molecular level. 2. Identifying the molecular structure of nucleic acids, their replication and their role in building protein 3. Understanding methods of controlling the level of gene expression in living cells. 4. Developing the student's perceptions by giving him an idea of recent trends in molecular biology. 5. Learn about modern applications of molecular genetics in various fields of life 6. Realizing the great progress in molecular genetics and its impact on human life.
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> 1. Help the students to understand the genetic material nature and how it can be duplicated and transferred to the following off spring 2. Develops the students own skills to deal with genetic material and the mechanisms of its extraction and diagnosis different damage 3. Encourage students to discuss various problems and possible disease that occurred due to specific DNA Damages. 4. The students learn what are the advantages of DNA and RNA extraction. 5. The students know the types of cell disruption and distinguish between these types. 6. The students can distinguish between molecular techniques and other technique.
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Part A – Theoretical lectures</u></p> <p>Chemical structure. physical properties of Nucleic acids. DNA REPLICATION1. DNA REPLICATION2. Transcription of prokaryotic DNA1. Transcription of prokaryotic DNA2.[10 hrs]</p> <p>, prokaryotic transcription. eukaryotic transcription. Translation in prokaryotics1. Translation in prokaryotics2.[8 hrs]</p> <p>Main differences between pro and eukaryotic translation1. Main differences between pro and eukaryotic translation2. Pro and eukaryotic gene structure.[10 hrs]</p> <p>Gene expression.1. Gene expression2. [8 hrs]</p> <p>Revision problem classes [3 hrs]</p> <p><u>Part B – Practical labs</u></p> <p>Introduction of information about laboratory safety.Introduction of cell disruption.DNA extraction .RNA extraction.Detection RNA and DNA.1.Detection RNA and DNA2..Estimation of DNA concentration and purity1.Estimation of DNA concentration and purity2. [18 hrs]</p> <p>PCR technique1.PCR technique2.Gel electrophoresis1.Gel electrophoresis2.Molecular techniques.1.Molecular techniques2.Molecular techniques3. [18 hrs]</p>

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Chemical structure .
Week 2	physical properties of Nucleic acids.
Week 3	DNA REPLICATION1.
Week 4	DNA REPLICATION2.
Week 5	Transcription of prokaryotic DNA1.
Week 6	Transcription of prokaryotic DNA2.
Week 7	prokaryotic transcription.
Week 8	eukaryotic transcription.
Week 9	Translation in prokaryotics1.
Week 10	Translation in prokaryotics2.
Week 11	Main differences between pro and eukaryotic translation1.
Week 12	Main differences between pro and eukaryotic translation2.
Week 13	Pro and eukaryotic gene structure.
Week 14	Gene expression.1.
Week 15	Gene expression2.

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

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

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

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Pathogenic Bacteriology		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Bio-412		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	4	Semester of Delivery	
Administering Department	Bio	College	COS
Module Leader	Dr.Muhsin Ayoub Essa	e-mail	Muhsbio13@oumosul.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Anmar Ahmad	e-mail	anmaraltaee1978@uomosul.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	02/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	This study aims <ol style="list-style-type: none"> 1. Communicate pathogenic bacteria information to students 2. Know their types and the diseases they cause 3. and methods of diagnosis 4. and treat it 5. And keep pace with the development that is happening in the world
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> 1. Every student be able to isolation and identification pathogenic bacteria from different clinical sites 2. Every student have a knowledge about antibiotic sensitivity test for each bacteria. 3. The field of specialization is teaching pathological bacteria in detail. 4- The students were able to understand the topic of pathogenic bacteria. 5- The student should know the terminology related to the subject of pathogenic bacteria 6- The student should understand the pathogenic mechanisms of bacteria and the types of bacteria that cause diseases 7- The student should understand methods of diagnosing pathogenic bacteria 8- The student should understand the methods of treating pathogenic bacteria
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> Introduction. Pathogenesis of Bacterial Infection .The Staphylococci. The Streptococci, Enterococci, and Related.[10 hrs] Enteric Gram-Negative Rods Enterobacteriaceae: E.coli. Salmonellae and Shigellae. Klebsiella and Proteus. Yersinia Species. [8 hrs] Pseudomonads and Vibrios. campylobacter and Haemophilus Species. Brucellae and Bordetellae. Spore-Forming Gram-Positive Bacilli: Bacillus. Clostridium Species.[10 hrs] Aerobic Non-Spore-Forming Gram-Positive Bacilli: Corynebacterium and Nocardia. Mycobacteria .Mycoplasmas and Cell Wall-Defective. Rickettsia and Related Genera. [8 hrs] Revision problem classes [3 hrs] <u>Part B – Practical labs</u> Introduction of biological lab. Safety.Methods for collection samples from patients1.. Methods for collection samples from patients2.Staphylococcus spp..Streptococcus spp.[18 hrs] Enterobacteriaceae 1.Enterobacteriaceae 2.Enterobacteriaceae 3.Enterobacteriaceae 4.Pseudomonas spp.Haemophilus spp.Bordetella spp.Lactobacillus spp.Vibrio spp.Clostridium. [18 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

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

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

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

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

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

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Food Microbiology		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Bio-413		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	4	Semester of Delivery	
Administering Department	Bio	College	COS
Module Leader	Dr. Shakir Ghaze	e-mail	shksbio48@uomosul.edu.iq
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Alla Almola DR. Safaq Tariq	e-mail	alabio58@uomosul.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	02/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Aquatic and Soil Microbiology	Semester	5
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	This study aims <ol style="list-style-type: none"> 1. Conveying information to students about microorganisms that grow in food, causing spoilage and spoilage. 2. growth conditions. 3. control the health problems caused by such as diseases and food poisoning.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> 1- The field of specialization is teaching the growth of microorganisms in food and dairy and the spoilage it causes 2- Teaching the microbial populations responsible for food poisoning and developing and implementing procedures related to combating food poisoning infection. 3- Describe the controls that can be used to control microbial and enzymatic activity to reduce the rate of food spoilage and spoilage. 4- Assessment of the burden of food contamination and foodborne diseases 5- Describe how bacteria produce toxins and distinguish between exotoxins and endogenous toxins. 6- Students were able to understand the principles of food microbiology 7- Help students how to master the role of microorganisms in spoilage of food and study the environment factors effects on food spoilage 8- Encouraging students to develop their skills and Give students homework
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> [Introduction.Microbial spoilage of food..Factors affecting growand survival of microorganisms in foods. Intrinsic factors. 10 hrs] Extrinsic factors.Principles of food preservation.And Foo preservation by use of high temperatures. Food preservation b use of low temperature.[8 hrs] And Preservative by food additives. Food preservation by radiation.. Spoilage of milk and milk products. Microbiology of fruits and vegetables. [10 hrs] Microbiology of meat and meat products .Spoilage of meat and meat products. Bacterial causes of food poisoning. [8 hrs] Revision problem classes [3 hrs] <u>Part B – Practical labs</u> History of m.o. in food.Laboratory safety.Enumeration of microorganisms.Microbiological examination of milk.:Microbial examination of dairy product.Microbial examination of cheese.Detection of coliform.[18 hrs] Microbial examination of milk cattle have mastitis.Microbial examination of flour and sugar.Microbial examination of fruit juice.Microbial examination of meat.Microbial examination of frozen foods. Microbial examination of poultry meat and fish.Microbial examination of eggs. Microbial examination of eggs and Microbial examination of canned foods.[18 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Expanding students' perceptions about this science and its contents . Various techniques were used such as. Data show , Microscope, Posters Students do study the following fields: Normal flora and pathogenic in food. Develop students' skills in terms of acquired and natural skills. The student was able to carry out the tasks of teaching pathogenic bacteria. The student was able to work in laboratories, hospitals and health institutions. The student was able to be aware of safety issues from diseases and their treatment in case of injury. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.
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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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

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

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: History of m.o. in food.
Week 2	Lab 2: Laboratory safety.
Week 3	Lab 3: Enumeration of microorganisms.
Week 4	Lab 4: Microbiological examination of milk.
Week 5	Lab 5: Microbial examination of dairy product.
Week 6	Lab 6: Microbial examination of cheese.
Week 7	Lab 7: Detection of coliform.

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

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

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Comparative Anatomy		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Bio-414		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	4	Semester of Delivery	
Administering Department	Bio	College	COS
Module Leader	Dr. Fatima Kasim Mohammad	e-mail	fatsbio25@uomosul.edu.iq
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Ilham Abd Allah Ali Al-Saleem	e-mail	ilhsbio41@uomosul.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	02/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Animal Physiology	Semester	6
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	This study aims <ol style="list-style-type: none"> 1. Communicating anatomical information to students in the different types of vertebrates. 2. compare its members . 3. keep pace with the development that is happening in the world
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> 1. The students could able recognize the classification of chordate animals 2. students could able to recognize the characteristics of chordata 3. They can distinguish different parts in different chordate animals with their functions. 4. Student can understand the comparative anatomy of vertebrates. 5. Help the student to be professional biologist. 6. Encourage the student to develop his skills in comparative anatomy.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> Introduction & historical overview, of chordates & vertebrates. taxonomy of chordates & vertebrates. Evolutionary relationship, protochordates. Protochordates. [10 hrs] , Comparative anatomy of integument of chordates, skin derivatives1. Comparative anatomy of integument of chordates, skin derivatives2. Comparative anatomy of integument of chordates, skin derivatives3. [8 hrs] Comparative anatomy of integument of chordates, skin derivatives4. Comparative anatomy of digestive. Comparative anatomy respiratory system. Comparative anatomy of excretory system & types of kidneys1.[10 hrs] Comparative anatomy of excretory system & types of kidneys2. Comparative anatomy of skeletal system.Comparative anatomy of nervous system. sense organs. [8 hrs] Revision problem classes [3 hrs] <u>Part B – Practical labs</u> The characteristics of chordate.subphylums of chordate,urochordata .subphylums,hemichordate. r subphylums cephalochordate. The classes of fishes agnatha. chondrichthyes. Osteochthyes. the beginning of tetrapoda. [18 hrs] The characteristics of class amphibian, and the orders of it1. The characteristics of class amphibian, and the orders of it2. The characteristics of class Reptilia1. The characteristics of class Reptilia2. The characteristics of class Aves. The characteristics of class Mammlia1. The characteristics of class Mammlia2. [18 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Expanding students' perceptions about this science and its contents . Various techniques were used such as. Data show , Microscope, Posters Students do study the following fields: The characteristics of chordate animals.They understand the four subphylums of chordate. The classifications and characteristics of Psices.They study the subphylum of vertebrata. Taxonomy of chordates. Evolutionary relationship. Protochordates. Comparative anatomy of all systems in the vertebrate body. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students
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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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

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

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: The characteristics of chordate.
Week 2	Lab 2: subphylums of chordate,urochordata,.
Week 3	Lab 3: subphylums,hemichordate.
Week 4	Lab 4: r subphylums cephalochordate.
Week 5	Lab 5: The classes of fishes agnatha .
Week 6	Lab 6: .chondrichthyes.
Week 7	Lab 7: Osteochthyes .
Week 8	Lab 8: the beginning of tetrapoda.
Week 9	Lab9: The characteristics of class amphibian, and the orders of it1.

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

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

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

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Optional Enzymology		Module Delivery	
Module Type	Elective		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code	Bio-415			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	4	Semester of Delivery		7
Administering Department	Bio	College	COS	
Module Leader	Dr. Mohammad Huseen		e-mail	mohsbio16@uomosul.edu.iq
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Shafaq Tariq		e-mail	Shasbio108@uomosul.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail	
Scientific Committee Approval Date	02/06/2023	Version Number	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Objectives أهداف المادة الدراسية</p>	<p>This study aims</p> <p style="text-align: center;">Students do study the following fields:</p> <ol style="list-style-type: none"> 1. Classification of enzymes 2. Characteristic of enzymes 3. Structure of enzymes
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> 1. Comprehension enzyme properties. 2. Conception the enzymatic chemical reaction. 3. Perception the application of enzymes. 4. The Students learn how to prepare chemical solutions 5. The students Learn how to prepare bacterial extract 6. The students Learn how to detect different types of enzymes
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Part A – Theoretical lectures</u></p> <p>Introduction to enzymology. General review of protein. Nomenclature of enzyme .Activation energy. Mechanism of enzyme action . Specificity of enzyme. Assay of enzyme and Units of enzyme activity. 1. Assay of enzyme and Units of enzyme activity. 2. [10 hrs]</p> <p>Enzyme inhibition part 1 and 2. Enzyme inhibition part 1 and 2. Enzyme kinetics part 1 and 2. Enzyme kinetics part 1 and 2. [10 hrs]</p> <p>Examples of enzyme inhibition. Clinical enzymology. Industrial enzymology. [8 hrs]</p> <p>Revision problem classes [3 hrs]</p> <p><u>Part B – Practical labs</u></p> <p>Introduction to Enzymes.: Preparing chemical solutions. Cell disruption methods 1. Cell disruption methods 2. Preparation of bacterial extract. Protease enzyme. Lipase enzyme. [18 hrs]</p> <p>Aspartate aminotransferase, Alanine aminotransferase. Decarboxylase enzyme .denitrification. Alkaline phosphatase.: Cytochrome oxidase.. catalase. Lecithinase .coagulase. of antibiotic: 3. Production of biogas (methan. Solution preparation 1. Solution preparation 2. [18 hrs]</p>

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	<p>Teaching Techniques: The lectures are explained through audio files, videos and recording files of the lectures so that the student can refer to them whenever he wants that to avoid the problems of power outages and weak in internet. The lectures are also explained and communicating with students through the meeting by the Classroom for the purpose of agitation topics related to the scientific subject to be discussed in a scientific way. Students are given daily tests in order to keep the student in touch with the scientific material and to consolidate the information in the student's mind. Assigning students to answer intellectual questions about some topics and discussing them in the next lecture to develop the aims of scientific research and delve into the subtleties of the scientific material and study the various aspects of the subject in terms of its connection to other science and their applications.</p> <p>Assigning students to write some reports related to the scientific subject and their interaction with the scientific material to set grades that fall within the student's scientific assessment . Taking into consideration the student's attendance in lectures and the extent of his ability to participate in the discussions presented during the lectures, and this is part of the student's assessment methods. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.</p>
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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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

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

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

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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

Learning and Teaching Resources

مصادر التعلم والتدريس

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

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Microbial Genetics		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Bio-421		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	4	Semester of Delivery	
Administering Department	Type Dept. Code	College	Type College Code
Module Leader	Dr. Rayan Mazin Faesal	e-mail	rayanmazin@uomosul.edu.iq
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Ghada Abdulrazaq	e-mail	kadsbio32@uomosul.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	02/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Molecular Biology	Semester	7
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	This study aims <ol style="list-style-type: none"> 1- The course aims to show that microorganisms, especially bacteria, possess a genetic apparatus, contrary to what was rumored that the phenotypic differences in bacteria are based on adaptation. 2- This genetic system, in its molecular basis and in performing its various functions, does not differ from the genetic system of the rest of living organisms.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> 1. Enable students to understand the importance of mutations, if it is the source of genetic variation, or if the mutation is the source of many diseases and disorders. 2. Understand plasmids, their role in bacteria, types of their replication, and the importance of the genes they carry. 3. Understand how DNA is mobilized between bacteria either naturally or by genetic engineering. 4. Encouraged the students to improve their skills in critical thinking in genetic engineering techniques. 5. By studying this subject, student, could understand genetic microbiology. 6. Helping the student to understand molecular genetic strategies like PCR basics. 7. Encouraging student to develop their skills in laboratory tests. 8. understanding molecular biological studies, the manipulation of eukaryotic organisms, and practical applications (biotechnology) in diverse areas of life sciences.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> Introduction. Mutations and their types.1. Mutations and their types.2. DNA repair1. DNA repair2. Selection of mutants Selection of mutants[18 hrs] Plasmids and copy number regulation1. Plasmids and copy number regulation2. Gene regulation part 1. Gene regulation part 2. Gene regulation part 3.[18hrs] Transformation and competence. Conjugation. transduction [8 hrs] Revision problem classes [3 hrs] <u>Part B – Practical labs</u> Introduction in genetic lab principles.Detection of spontaneous mutation.1.Detection of spontaneous mutation2.Detection of spontaneous mutation3.Detection of antibiotic resistance1.Detection of antibiotic resistance2. [18 hrs] Horizontal gene transfer: transformation1.Horizontal gene transfer: transformation2.Conjugation.PCR.electrophoresis.Plasmid isolation.Plasmid curing.Ames Test[18 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

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

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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

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

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

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	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	Virology		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Bio-422		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	4	Semester of Delivery	
Administering Department	Bio	College	COS
Module Leader	Dr. Shakir Ghaze	e-mail	shksbio48@uomosul.edu.iq
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Anmar Ahmad	e-mail	anmaraltaee1978@uomosul.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	02/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Molecular Biology	Semester	7
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	This study aims <ol style="list-style-type: none"> 1. Provide information about viruses. 2. Its types. 3. classified. 4. structure. 5. diseases. 6. treat it. 7. prevention. 8. For students, a Encourage the student to keep abreast of the development taking place in virology in the world
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> 1. They are filterable agents. 2. They are obligate intracellular parasites. 3. They contain a single type of nucleic acid, i.e., either DNA or RNA, but not both. 4. The virion of the virus particle consists of a nucleic acid genome packaged into a protein coat (capsid), which itself is sometimes enclosed by an envelope of lipid, proteins, and carbohydrates known as envelope. 5. They multiply inside the living cells by using the synthesizing machinery of the host cell. 6. They replicate by the assembly of the individual components and do not replicate by division, such as binary fission.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> I History of Virology .Introduction of Virology. Virus Structure..Virus Nomenclature and Classification .General features of viral replication cycles and genetics.Spread of viral infection.Virus transmission .. [18hrs] Host resistance to viral infections.Bacteriophages.Medically important viruses.[10 hrs] DNA enveloped viruses.DNA none enveloped viruses.RNA enveloped viruses.Human cancer viruses.Human cancer viruses2. [18 hrs] Revision problem classes [3 hrs] <u>Part B – Practical labs</u> Biological hazards and Sample preparation .Detection of viruses direct Examination using Light microscopy (Histological study.(Morphology study using Electron Microscopy (videos (Culture, Growth of virus on embryonated eggs. .Cell line and tissue culture techniques. Virus cultivation in tissue culture.Virus inoculation in lab.animals.Bacteriophage plaque assay for phage titer.. [18 hrs] Serology detection of virus using ELISA.Serology detection of virus using

	Immunofluorescence techniques..Agglutination and precipitation test..Haemagglutination inhibition and Neutralization tests..Detection of viruses using molecular methods (nucleic acid extraction)(Viral Genome Detection: PCR technique..Real-Time PCR & DNA sequencing (videos) [18 hrs
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents .The viruses are too small to be seen with a light microscope. Their small size allows them to pass through filters that are used to retain back bacteria in contaminated fluids. Hence, they were first described as filterable agents. Viruses, like other microorganisms (e.g., bacteria, fungi, and parasites), are the infectious agents that are associated with disease in humans.The viruses unlike other infectious agents are obligate intracellular parasites, i.e., they absolutely require living host cells in order to multiply. In addition, viruses replicate by assembly of the individual components rather than by binary fission .This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

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

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Biological hazards and Sample preparation
Week 2	Lab 2: Detection of viruses direct Examination using Light microscopy (Histological study).

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

Learning and Teaching Resources

مصادر التعلم والتدريس

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

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Industrial Microbiology		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Bio-423		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	4	Semester of Delivery	
Administering Department	Bio	College	COS
Module Leader	Dr. Ameera Al-Rawi	e-mail	amesbio5@uomosul.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Alla Almola	e-mail	alabio58@uomosul.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	02/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	This study aims <ol style="list-style-type: none"> 1. Convey information to the student about the microorganisms used in the industry. 2. To produce organic acids. 3. Vaccines. 4. fermented food 5. Antibiotics.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> 1. Students were able to understand the principles of industrial microbiology 2. Help students how to master the role of microorganisms in industry 3. Encouraging students to develop their skills and the application mechanisms of microbial industry and how to exploit them in the market 4- By studying this subject, the student could understand industrial microbiology and the importance of it . 5. Helping the student to perfection the experiment of industrial microbiology 6. Encouraging student to develop his skills in laboratory . 7. Give students homework 8. the lecture includes the principle of explanation, clarification, , discussion, practical aspects, etc.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> Introduction. Industrial microbiology and Fermentation. Fermentation. Industrial microorganisms and its nutritional requirements. . fermentation media ;Extraction and purification of products. Fermenters ,metabolites, fermentation conditions. microbial production of enzymes. [18 hrs] SCP production. bakery yeast production. Organic acid production: Vitamins production. [10 hrs] Fatty acids production; Ethanol and other solvents production. Antibiotic production. Beer production. Wine production. [18 hrs] Revision problem classes [3 hrs] <u>Part B – Practical labs</u> Requirement for industrial fermentation Production of ethanol and vinegar .Production of ethanol and vinegar. Production of lactic acid and glutamic acid by fermentation. Production of lactic acid and glutamic acid by fermentation. Industrial production of citric acid. Industrial production of citric acid. [18 hrs] Single cell protein. Production of antibiotic: penicillin. Production of antibiotic: 2. Production of antibiotic: 3. Production of biogas (methan. Solution preparation 1. Solution preparation 2. [18 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	<p>Expanding students' perceptions about this science and its contents . Various techniques were used such as. Data show , Microscope, Posters .Students do study the following fields:Fermentation and fermenters..Industerial microorganisms. Fermentation media and nutritional requirements .Microbial production of metabolites.Aerobic and Anaerobic fermented microbial production of :Bakery yeast production .SCP production .Antibiotic production.Vinegar production .Organic acids .Ethanol ,Aceton and other solvents .Microbiaproduction oEnzymes and Vitamins. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.</p>
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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
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

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

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Requirement for industrial fermentation
Week 2	Lab 2: Production of ethanol and vinegar .
Week 3	Lab 3: Production of ethanol and vinegar .
Week 4	Lab 4: Production of lactic acid and glutamic acid by fermentation.
Week 5	Lab 5: Production of lactic acid and glutamic acid by fermentation.
Week 6	Lab 6: Industrial production of citric acid.
Week 7	Lab 7: Industrial production of citric acid.

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

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

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Optional Antibiotics		Module Delivery
Module Type	Elective		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	Bio-424		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	4	Semester of Delivery	
Administering Department	Bio	College	COS
Module Leader	Dr. Essra Al- Sammak	e-mail	esrsbio19@uomosul.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Sahar Lukman	e-mail	sahar.alsaleem@uomosul.edu.iq
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	02/06/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	This study aims <ol style="list-style-type: none"> 1. Identify the main groups of antibiotics and the mechanism of action of each. 2. Understanding the problem of antibiotic resistance. 3. How to acquire it. 4. Associated outcomes in antibiotic therapy. 5. Understanding the mechanisms of resistance.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none"> 1.the student know the types of antibiotics . 2.the spread of bacteria resistance . 3. how classify antibiotics . 3.The Students understood what is Antibiotics preparation 4. The students were perfect in Antimicrobial suseptibility test 5. Try to improve their skills in Antibiotic resistancs mechanisms.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> Definition of some terms . & General Characteristics of Antimicrobial Drugs. Classification of Antibacterial Drugs. How do antibiotics work? Bactericidal and Bacteriostatic Antibiotics. Factors Influencing Antimicrobial.& Overcoming Drug Resistance. Perfect antibiotics must be .Main Types of Side Effects Associated with Antimicrobial Treatment.[18hrs] , Mechanisms of Resistance . Empiric therapy prior to completion of lab tests. Antibiotic combinations .Classification of antibiotic according to their function Inhibitors of Cell Wall Synthesis .Protein Synthesis Inhibitors. Protein Synthesis Inhibitors. Cell membrane disruptors [18 hrs] Metabolic Antagonists. Nucleic Acid Synthesis Inhibition. New approaches for developing effective antimicrobials drugs.. [10 hrs] Revision problem classes [3 hrs] <u>Part B – Practical labs</u> Introductin,Preparation of Antibiotics. Introductin,Preparation of Antibiotics Antimicrobial suseptibility test,Affected factors on it. Antimicrobial suseptibility test,Affected factors on it. MIC,Interactions between antibiotics1. MIC,Interactions between antibiotics2. β lactamase detection,Detection of glycopeptides resistance [18 hrs] lactamase detection,Detection of glycopeptides resistance Detection of macrolides and Quinolones resistance Detection of macrolides and Quinolones resistance Detection of antibiotics producing bacteria, Detection of antibiotics in food Detection of antibiotics producing bacteria, Detection of antibiotics in food Detection of antibiotic resistance gene by PCR Detection of antibiotic resistance gene by PCR.Review [18 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Expanding students' perceptions about this science and its contents .Students do study the following fields:A chemotherapeutic agent or drug.Main terms used in antibiotics .Classification of antibiotic. Antibiotics resistance & side effects .Teaching Techniques: Variety(practical work,Data show , vedio. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods and involving some sampling activities that are interesting to the students.
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	79	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	5
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	Definition of some terms . & General Characteristics of Antimicrobial Drugs .
Week 2	Classification of Antibacterial Drugs.
Week 3	How do antibiotics work? Bactericidal and Bacteriostatic Antibiotics.
Week 4	Factors Influencing Antimicrobial.& Overcoming Drug Resistance.
Week 5	Perfect antibiotics must be.
Week 6	Main Types of Side Effects Associated with Antimicrobial Treatment.
Week 7	Mechanisms of Resistance .
Week 8	Empiric therapy prior to completion of lab tests.
Week 9	Antibiotic combinations.
Week 10	Classification of antibiotic according to their function Inhibitors of Cell Wall Synthesis.
Week 11	Protein Synthesis Inhibitors.
Week 12	Protein Synthesis Inhibitors. Cell membrane disruptors
Week 13	Metabolic Antagonists.
Week 14	Nucleic Acid Synthesis Inhibition.
Week 15	New approaches for developing effective antimicrobials drugs.

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introductin,Preparation of Antibiotics
Week 2	Lab 2: Introductin,Preparation of Antibiotics
Week 3	Lab 3: Antimicrobial suseptibility test,Affected factors on it.
Week 4	Lab 4: Antimicrobial suseptibility test,Affected factors on it.
Week 5	Lab 5: MIC,Interactions between antibiotics1.
Week 6	Lab 6: MIC,Interactions between antibiotics2.
Week 7	Lab 7: β lactamase detection,Detection of glycopeptides resistance
Week 8	Lab 8: β lactamase detection,Detection of glycopeptides resistance

Week 9	Lab9: Detection of macrolides and Quinolones resistance
Week10	Lab 10: Detection of macrolides and Quinolones resistance
Week 11	Lab 11: Detection of antibiotics producing bacteria, Detection of antibiotics in food
Week 12	Lab 12: Detection of antibiotics producing bacteria, Detection of antibiotics in food
Week 13	Lab 13: Detection of antibiotic resistance gene by PCR
Week 14	Lab 14: Detection of antibiotic resistance gene by PCR
Week 15	Lab 15: Review

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Willey ,J.M .; Sherwood, L.M.; Woolverton, C.J (2017).Prescott s Microbiology.10 th ed McGraw-Hill Companies, U.S.A.	Yes
	Gerard J. Tortora , Berdell R. Funke ,Christine L. Case .(2013) Microbiology An Introduction, 11ed .	Yes
	Andre Zapun , Carlos Contreras-Martel & Thierry Vernet. (2008) Penicillin-binding proteins and β -lactam resistance Federation of European Microbiological Societies.	Yes
	Michael A. Kohanski, Daniel J. Dwyer and James J. Collins. (2010) microbiology: How antibiotics kill bacteria: from targets to networks. Vol 8.	Yes
Recommended Texts	Second Meeting of the Subcommittee of the Expert Committee on the Selection and Use of Essential Medicines Geneva, 29 September to 3 October 2008.	no
Websites	https://www.reactgroup.org/wp-content/uploads/2016/10/tbx-basic-lecture-abr.pdf	

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