University of Mosul

College of Environmental Sciences

Department of Environmental Technologies

MODULE DESCRIPTION FORM

Bologna Process

MODULE DESCRIPTION FORM

Module Information					
Module Title	**General Biology**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code	UoM				
ECTS Credits	**7**				
SWL (hr/sem)	**175**				
Module Level		UG1	**Semester of Delivery**		1
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Shaymaa Khaleel Abdullah Mayada Ahmed AL-Taii		**e-mail**	drshaymaakhleel@uomosul.edu.iq maysbio55@uomosul.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor	Diana Nooraldine Mustafa Abdullah Abdusttar Thanoon		**e-mail**	Dyasbio86@uomosul.edu.iq abdullah84@uomosul.edu.iq	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents

Module Aims	**1- The study of general biology aims to introduce the student to the groups of living organisms and the nature of their structural parts.** **2- Studying the multiple cellular structures according to the type of organism.** **3- Knowing how they spread and distribute in the surrounding environment and their interaction with it.**
Module Learning Outcomes	**1- Learn about biology, its branches, and its importance to humans and the environment** **2- Distinguish different cell shapes and their diversity according to the type of organism.** **3-Studying the chemical nature of cellular components.** **4- Understanding the difference between eukaryotic and prokaryotic organisms.** **5- Studying the process of cell division and growth** **6- identify the mechanism of formation the reproductive structures in higher organisms.** **7-Knowing the basics of classification and scientific naming of eukaryotic organisms.** **8-Distinguishing the phylum's and families of the animal and plant kingdoms .** **9-Clarifying the different feeding methods in animals and the process of energy production and metabolism.** **10-Explain the nutritional metabolic activities in plants.** **11- Studying the nature of the relationship between species of organisms and their surrounding environment.**
Indicative Contents	**Indicative content includes the following:** **Introduction - to biology, its branches and importance. - General instructions (7h)** **The cell: its discovery and structure - non-living cellular components - the nucleus and cellular organelles - the microscope and its components - estimation of the dimensions of cells and organelles - plant cells - animal cells (21h).** **Forms of living cells - animal and plant - cell types, plant and animal - meristematic tissues + parenchyma + sclerenchyma - epidermis + wood + bark +**

	vascular tissues - practical exam (9h) **Cell Division - Mitosis and Reduction - Mitosis Lab (6h)** **review (4h)** **midterm exam (1h)** **Reproduction and growth in animals - Reproduction and growth in plants (10h)** **Classification and Scientific Nomenclature - People of the Plant Kingdom - People of the Animal Kingdom - Protozoa (Amoebae + Paramecium) - Sponges and Hydra - Worms and Insects - Animal Tissues (25h)** **Nutrition and photosynthesis in plants - for feeding, digestion and metabolism in animals (10h)** **Environment and its effect on the distribution of animals and plants (5)** **review (4h)** **final exam(3h)**

Learning and Teaching Strategies	
Strategies	**The main strategy that will be adopted in presenting this course is to encourage students to read and discuss, and to provide the student with the skill of scientific observation and description of the phenomenon, while improving their critical thinking skills at the same time. This will be achieved through daily and quarterly examinations, daily discussions, and through hands-on observations in laboratory experiments that include some sampling activities and examination of specimens and microscopic slides of the subject.**

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (hr./sem.)	108	**Structured SWL (hr./w)**	7.2
Unstructured SWL (hr./sem.)	67	**Unstructured SWL (hr./w)**	4.5
Total SWL (hr./sem.)	175		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	10% (10)	Lab. 7, 14 Lec. 5, 13	LO # 2-5 and 7-9 LO # 1,2,3 and 6,7
	Assignments	1	10% (10)	5	LO # 4
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)		
Summative assessment	Midterm Exam	1 hr.	10% (10)	7	LO # 1-5
	Final Exam	3hr.	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Biology
Week 2	The Cell: discovery and structure
Week 3	The Cell : Non-living cellular components
Week 4	The Cell : the Nucleus and Cellular organelles
Week 5	Shape of the Cell : Plant and Animal Cells and quiz 1
Week 6	The Cellular Divisionmitosis
Week 7	The cell division : meiosis and Mid-term Exam
Week 8	Growth and Reproduction in animals
Week 9	Growth and Reproduction in Plants
Week 10	Classification and Nomenclature
Week 11	The Animal Kingdom
Week 12	The Plant Kingdom
Week 13	Nutrition , Digestion and Metabolism in Animals and quiz 2
Week 14	Nutrition and photosynthesis in plants
Week 15	Environment and its influence on the distribution offauna and flora
Week 16	The final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	**General Instructions**
Week 2	**Microscope and its components**
Week 3	**Estimating the dimensions of cells and organelles**
Week 4	**Cell division**
Week 5	**Meristemic tissue + parenchyma + sclerenchyma**
Week 6	**Epidermis + xylem + bark + vascular tissue**
Week 7	**Part 1 exam**
Week 8	**Cells : plant and animal types**
Week 9	**Protozoa: amoeba + paramecium**
Week 10	**Sponges and Hydra**
Week 11	**Worms and insects**
Week 12	**Starfish and arthropod**
Week 13	**Animal tissue**
Week 14	**Part 2 exam**
Week 15	**final exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	علم الاحياء ج1 ، ج2 . لجنة من وزارة التعليم العالي والبحث العلمي	
Recommended Texts	Jeff Hardin, Gregory Paul Bertoni, Lewis J. Kleinsmith - Becker's World of the Cell (8th Edition) (2011, Benjamin Cummings). Sylvia Mader, Michael Windelspecht - Essentials of Biology (2017, McGraw-Hill). Jain,Dk., Singh, V., Pande, Pc. (2018).Textbook of Botany.Fifth Ed.,India.	No
Websites		

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

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

MODULE DESCRIPTION FORM

Module Information					
Module Title	General Chemistry I			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code					
ECTS Credits	**7**				
SWL (hr/sem)	**175**				
Module Level		1 (Undergraduate)	**Semester of Delivery**		1
Administering Department		Type Dept. Code Department of Environmental Technologies	**College**	Type College Code College of Environmental Science and Technologies	
Module Leader	Dr.Eman A.M. Al-jawadi		**e-mail**	emanaljawadi@uomosul.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Ph.D./Chemistry Science
Module Tutor	Mohammed Saadallah Younus Lena nofel mohammed salih Mustafa Amer Dhannoon Lab . Abeer Saleh Atiya		e-mail		
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**		

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

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	To students; to provide the necessary knowledge accumulation in professional fields by comprehending basic chemistry subjects, to give knowledge of chemistry and the ability to apply concepts to the solution of chemistry problems.
Module Learning Outcomes	To be able to follow developments in chemistry fields such as environment, pharmaceuticals, food, polymers, paint, and health and solve the basic problems in research and development laboratories related to these fields
Indicative Contents	SKILLS Ability to apply theoretical and practical knowledge of chemistry to advanced studies in the chemical industry Ability to apply occupational safety principles to ensure the safe use and disposal of chemicals and keep their global environmental impact at minimum level To be able to adapt to the rapidly developing technological environment with the awareness of lifelong learning and follow the developments in science and technology To be able to follow developments in chemistry fields such as environment, pharmaceuticals, food, polymers, paint, and health and solve the basic problems in research and development laboratories related to these fields

Learning and Teaching Strategies	
Strategies	Strategies of Teaching is knowing prenciples of chemical and methods and apparatus used .

Student Workload (SWL)			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	108	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7.2 (108/15)
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	67	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.46 (67/15)
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)	4,6,8,12,15	LO #1 -3,4-5,6-7,19-12and 13-14
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Tutorial	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	9	LO # 1-8
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Module Name	SSWL(hr/W)						Exam (hr/Sem)	SSWL (hr/Sem)	USSWL (hr/Sem)	SWL (hr/Sem)	ECTS
	CL (hr/W)	Lect (hr/W)	Lab (hr/W)	Pr (hr/W)	Tur (hr/W)	SEM (hr/W)					
General Chemistry I 1st Class	3	1	2		1		3	108	67	175	7
	45 (3/15)	15 (1/15)	30 (2/15)		15 (1/15)		3				

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**General Introduction, Chemical Bonds and Molecular Structures**
Week 2	**Periodic Relationships Among the Elements, Atomic and Molecular Orbitals, Hybridizations**
Week 3	**Chemical Bonding II: Molecular Geometry and Hybridization**
Week 4	**Functional Groups, Intermolecular Forces.quiz**
Week 5	**An Introduction to Organic Reactions and Their Mechanism, Nomenclature and Conformation of Alkanes / Cycloalkanes**
Week 6	**Nucleophilic Substitution Reactions of Alkyl Halides .quiz**
Week 7	**Properties and Synthesis of Alkenes and Alkynes**
Week 8	**Aromatic Compounds , Rezonance Theory. quiz**
Week 9	**Mid-term Exam**
Week 10	**General properties of solutions**
Week 11	**Concentration.. Ideal, diluted or concentrated solutions.**
Week 12	**Solubility. Solutions of electrolites .quiz**
Week 13	**. Changes of state in liquid solutions**
Week 14	**Osmosis. Colligative properties and determination of molecular weight.**
Week 15	**Colloidal systems:Hydrophilic and hydrophobic colloidal systems.: micelles and bilayers. quiz**
Week 16	**final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	**Qualitative analysis of cations**
Week 2	**Melting point**
Week 3	**boiling point**
Week 4	**simple distillation**
Week 5	**Fractional distillation**
Week 6	**Sublimation**
Week 7	**Recrystallization**
Week 8	**Purification of NaCL**

Week 9	**Determination of Fe +3 and Fe+2**
Week 10	**Purification of NaCL & KCL**
Week 11	**Complex preparation**
Week 12	**Preparation of methane gas**
Week 13	**Acetylene preparation**
Week 14	**Identification of double and triple bond (in unsaturated compounds)…1**
Week 15	**Identification of double and triple bond (in unsaturated compounds)…2**

Learning and Teaching Resources

	Text	**Available in the Library?**
Required Texts	Chemistry, 13th Edition, Raymond Chang & Jason Overby	
Recommended Texts	General Chemistry: Principles and Modern Applications, 11th Edition, Ralph H. Petrucci, F. Geoffrey Herring, Jeffry D. Madura, Carey Bissonnette	
Websites		

Grading Scheme
مخطط الدرجات

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**English Language 1**			**Module Delivery**	
Module Type	**B**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UOM1021**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level		1	**Semester of Delivery**		1
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Wissam Saeed		**e-mail**		
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		M.A.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		01/06/2023	**Version Number**		1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To support the highest degree of academic achievement by students who are not native speakers of English. 2. To improve basic English skills. 3. To determine how words function in a sentence. 4. To encourage students to express themselves in English. 5. To understand negatives and questions in English. 6. This course introduces the principles of academic writing.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Identify the main parts of speech in English. 2. Explain English pronouns and how to use them. 3. Illustrate English adjectives and adverbs. 4. Explain English prepositions 5. Discuss conversation skills and encouraging students to participate in a dialogue. 6. Improve the pronunciation skills of students. 7. Introduce the main functions of English grammar. 8. Describe verb to be. 9. Illustrate English present simple tense. 10. Discuss regular and irregular verbs. 11. Describe English past simple tense. 12. Identify Negatives and Question words. 13. Discuss present continuous tense. 14. Explain requests and offers. 15. Have knowledge of Environmental Terminology

Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A- Parts of speech: Introduction - Pronouns (definition, types, and use of pronouns) - Adjectives(definition, types, and use of adjectives) – Adverbs (definition, types, and use of adverbs) – Prepositions (definition, types, and use of prepositions) [14 hrs] Part B- Conversation skills: Encouraging students to express themselves in English – to talk about science using English – improvement of pronunciation skills [4 hrs] Revision problem classes [2 hrs] Part C- English grammar: 1. Introduction - Verb to be – Present continuous tense -Negatives – Questions- Present simple tense –Question words –Present perfect tense- Regular and irregular verbs - Environmental Terminology – [22 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Some effective strategies will be adopted in delivering this module such as, focusing on academic language, vocabulary exercises. Students will be given an opportunity to produce language through reading and speaking with receiving direct feedback to increase their comprehension and improve their language skills. This will be achieved through classes, group discussion, solving exercises, participation in conversations, interactive learning and writing 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	30	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1	10% (10)	5, 10	LO # 1, 2, ,3, 6, 8, 9, 10, and 13
	Online Assignments	1	10% (10)	2, 7, 12	LO # 2, 4 , 5, 10, 11, 12, 13 and 14
	Onsite Assignments	1	10% (10)	2, 7, 12	LO # 2, 4 , 5, 10, 11, 12, 13 and 14
	Projects / Lab.	0	0% (0)		
	Report	1	10% (10)	13	LO # 1, 6 and 12
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-6
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Improve the pronunciation skills of students.
Week 2	Identify the main parts of speech in English.
Week 3	Explain English pronouns and prepositions.
Week 4	Illustrate English adjectives.
Week 5	Illustrate English adverbs.
Week 6	Discuss conversation skills and encouraging students to participate in a dialogue.
Week 7	Mid-term Exam
Week 8	Introduce the main functions of English grammar.
Week 9	Describe verb to be.
Week 10	Illustrate English present simple tense.
Week 11	Discuss regular and irregular verbs.
Week 12	Describe English present perfect tense.

Week 13	Identify Negatives and Question words.
Week 14	Discuss present continuous tense.
Week 15	Environmental Terminology
Week 16	**The final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Liz and John Soars, 2010, Headway, Oxford University Press.	No
Recommended Texts	English Grammar in Use, Raymond Murphy , 2nd edition, Cambridge University Press.	No
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
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	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
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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	**MATHEMATICS I**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code					
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		Bachelor's Degree	**Semester of Delivery**		1
Administering Department		Environmental Tech.	**College**	Environmental Science and Technology	
Module Leader	Marwan Jameel		**e-mail**	marwan.jameel@uomosul.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		01/06/2023	**Version Number**		1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. The aim of this course is to give an introductory course on basics concepts of analysis, to teach limit, derivative, integral concepts and their applications. 2. To develop problem solving skills and understanding of calculustheories through the application of techniques.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Define basic functions, take the limit of functions and investigate their continuity, 2. Take the derivatives of functions, using derivative a student can sketch and interpret the graph of functions, 3. Solve maximum and minimum problems, 4. Classify integrals, use techniques of integration, 5. Define and classify improper integrals, 6. Apply derivative and integral concepts to his/her profession. 7. Define sequences, analyze the convergence of sequences, can recognize series and use convergence tests for series, can find Taylor and Maclaurin series expansion of given functions.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Functions general overview, Limit and continuity, limits involving infinity, asymptotes.[15 hrs] Derivative and its applications-Chain rule, Mean Value theorem, Rolle?s theorem. [15 hrs] Curve sketching-Concavity, concave up, concave down, Maximum and minimum problems, Sequences and series-convergence and divergence [15 hrs] Introduction to integration, Definite integrals and fundamental theorem of calculus [15 hrs] Techniques of integration- Integration by parts, trigonometric integrals, integration of Rational functions, Improper integrals and Applications of integration. [20 hrs] Sequences and series-convergence and divergence, Convergence tests for series-Integral test, comparison test, the root and ratio test, Alternating series, Taylor and Maclaurin series.[10]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Activities are given in detail in the section of "Assessment Methods and Criteria" and "Workload Calculation" The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students in order to introducing the basic topics of analysis, to teach the concepts of limit, derivative, integration and their applications.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	90	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	60	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/ Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	4, 12	LO #1, 2, 10 and 11
	Assignments	All	10% (10)	Per week	All
	Attendance	All	10% (10)	Per week	All
	Projects / Lab.	1	5% (5)	Continuous	All
	Report and seminar	1	5% (5)	13	LO # 5, 8 and 10
Summative	**Midterm Exam**	2 hrs.	20% (20)	7	LO # 1-7

assessment	**Final Exam**	2 hrs.	40% (40)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Functions general overview
Week 2	Limit and continuity, limits involving infinity, asymptotes
Week 3	Derivative and its applications-
Week 4	Chain rule, Mean Value theorem, Rolle's theorem
Week 5	Curve sketching-Concavity, concave up, concave down
Week 6	Midterm exam, Maximum and minimum problems
Week 7	Introduction to integration
Week 8	Definite integrals and fundamental theorem of calculus
Week 9	Techniques of integration
Week 10	Integration by parts, trigonometric integrals
Week 11	Midterm exam
Week 12	integration of Rational functions
Week 13	Improper integrals and Applications of integration
Week 14	Sequences and series-convergence and divergence
Week 15	Taylor and Maclaurin series
Week 16	**Final exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Thomas, Calculus and Analytic Geometry, Addison-Wesley 1996.	Yes

Recommended Texts	Silverman R.A, Calculus with analytic geometry, Prentice-Hall Inc. 1985. Adams, R.A, Calculus, a complete course, Addison-Wesley 2003.	No
Websites	https://www.youtube.com/playlist?list=PLF797E961509B4EB5	

Grading Scheme
مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

Module Information					
Module Title	**Physics**			**Module Delivery**	
Module Type	**basic**			☒**Theory** ☒**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code					
ECTS Credits	**7**				
SWL (hr/sem)	**175**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Ali Basheer		**e-mail**	E-mail	
Module Leader's Acad. Title	teacher		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Rihab Raad Hamsa Burhan		**e-mail**	Rihab@uomosul.edu.iq hamsaalbazaz@uomosul.edu.iq	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	1. to Develop the student's skills and ability to understand the basic principles of classical physics and to reach and formulate physical laws 2. Enriching the student with various topics in physics such as mechanics and its topics (vectors, physical quantities, types of motion, Newton's laws and fluids), thermodynamics and its contents of topics such as (thermal equilibrium, general law of gases, etc.) in addition to electrical physics and the topics it contains related to current, voltages, resistors andtypes of connecting resistors in electrical circuits. 3. Helping and developing the student's abilities to solve mathematical problems related to the above topics. 4. The study contains the practical part, which includes a set of experiments that are conducted in the laboratory as a practical application of some of the topics that have been given to the student in the theoretical part.
Module Learning Outcomes	1.Identify the concept of vectors, vector and non-vector quantities, operations on vectors and their applications. 2. Know the difference between linear and rotational motion and identify Newton's laws of motion and types of energy. 3. Identify the concept of torque, harmonic movement and projectilesmovement. 4. Learn about thermodynamics, temperature scales and heat transfer methods. 5. Identify the properties of gases, the general law of gases and the concept of heat capacity. 6. Identify some concepts of fluid science such as fluid properties such as surface tension, capillary tubes, cohesion and adhesion forces. 7. Identify some concepts of electrical physics such as current, voltages, resistance and types of connecting resistors in electrical circuits. 8. Learn how to conduct some experiments and know their laws
Indicative Contents	Basic concepts of vectors/physical quantities, units and symbols, vector magnitude, vector units of axes, vector algebra, numerical product, vector product, some vector applications, force moment, vector representation, vector analysis, definitions of vector quantity and non-vector quantity - solving questions. [11h] Mechanics, velocity vector,acceleration vector, linear motion, laws of linear motion, circular motion, rotational motion, Newton's laws of motion, Newton's first law, mass and force, Newton's second and third laws, position functional force, concept of potential energy and kinetic energy, linear momentum, vertical motion, The work, force and force types. [12h] Torque – radial angle – double torque, harmonic motion – harmonic oscillator, motion on a curve – simple pendulum – motion of a restricted body, motion of projectiles – force analysis – question solving. [7h]

	Thermodynamics-Heat and Temperature-Thermal Equilibrium, Zero Law of Thermodynamics-Heat Capacity-First Law of Thermodynamics, Thermometers Thermocouples-Thermodynamic Processes, Work, Heat Transfer, Black Body Radiation. [12 h] Kinetic energy theory of gases, general properties of gases, ideal gas, general gas law,Boyle's law, Charles' law, applications of Charles' law, heat capacity of gases, specific heat capacity, molar heat capacity [12h] Fluid mechanics, definition and classification of fluids, shear stress, properties of fluid particles, dynamic movement, surface tension force, cohesion force, adhesion force, capillary tubes - calculating the height of the fluid inside the capillary tube. [17h] Ohm's law, specific conductivity, current density, resistance, specific resistance, connectingresistors, electromotive force, metallic conductivity, solving questions. [10 hours] Identifying the practical part of the material in the laboratory by conducting a set of experiments, some of which are related to the topics of the theoretical part, and proving its laws in practice. [24h]

Learning and Teaching Strategies	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students to participate in solving exercises, while improving and expanding thinking skills at the same time. This will be achieved through interactive classes and tutorials and through some experiments that include the practical application of what has been studied in the semester.

Student Workload (SWL)			
Structured SWL (h/sem)	108	**Structured SWL (h/w)**	7
Unstructured SWL (h/sem)	67	**Unstructured SWL (h/w)**	4
Total SWL (h/sem)	175		

Module Evaluation

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

Delivery Plan (Weekly Syllabus)

	Material Covered
week 1	Basic concepts of physical vectors/quantities, units and symbols, vector magnitude - vector units of axes - vector algebra
week 2	Numerical Product-Cross Product-Some Vector Applications, Momentum of Force -Vector Representation-Product Analysis
week 3	Definitions of Vector and Non-vector Quantum – Solving Questions
week 4	Mechanics - Velocity vector - acceleration vector - Linear motion - Laws of Linear Motion-Circular motion - rotational motion
week 5	Newton's laws of motion - Newton's first law - mass and force - Newton's second and third laws - Torque – Radial Angle – Dual Torque,
week 6	Position Function Force - Concept of Potential Energy and Kinetic Energy - Linear Momentum, Vertical Motion –The Work - Force and Types of Force
week 7	Midtearm Exam
week 8	Harmonic Motion -Motion on a curve - simple pendulum - movement of a restricted body - motion of projectiles - force analysis - solving questions
week 9	Thermodynamics - Heat and Temperature - Thermal Equilibrium, Zero Law of Thermodynamic - Heat Capacity - First Law of Thermodynamic - Work - Heat Transfer - Black Body Radiation
week 10	Kinetic energy theory of gases - general properties of gases - ideal gas - general law of gases - Boyle's law - Charles law - applications of Charles' law
week 11	Heat Capacity of Gases - Specific Heat Capacity - Molar Heat Capacity - Fluid Mechanics - Definition and Classification of Fluids - Shear Stress
week 12	Properties of fluid molecules - dynamic motion - surface tensile strength, cohesion strength - adhesion force - capillary tubes - calculation of fluid height inside capillary tube
week 13	Ohm's Law – Specific Conduction – Current Density
week 14	Resistance-Specific Resistance-Connecting Resistors
Week 15	Electromotive Force - Metal Conductivity - Solving Questions

Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 1	Lab 1:An introductory lecture on how to write reports and explain the chart
Week 2	Lab 2: Simple Pendulum
Week 3	Lab 3: proof of Hook's law
Week 4	Lab 4: use a helical spring to determine the value of ground acceleration and find the equivalent mass of a helical spring
Week 5	Lab 5: Coefficient of static friction
Week 6	Lab 6: Prism refractive index
Week 7	Lab 7: Refractive index of glass block
Week 8	Lab 8: The focal length of a convex lens
Week 9	Lab9: Speed of sound using a one-ended closed resonant tube
Week 10	Lab 10: Ohm's law
Week 11	Lab11: find the viscosity coefficient of a liquid
Week 12	Lab 12: Archimedes base

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	-Physics for students of medicine and biology / General Physics for students of the Faculty of Agriculture and Forestry / Dr. Shaker Jaber	Yes
Recommended Texts	-Concepts in modern physics/ Dr. Moneim Mashkour and Mr. Shaker Jaber -Physics for students of geology / Dr. Farouk Ubaid - Mechanics for the students of science and engineering / Dr. Taleb Naji - Practical physics in units / E Armtiage - translated by Dr. Edmond Tobia George	No

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

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

MODULE DESCRIPTION FORM

Module Information					
Module Title	AnalyticalChemistry			**Module Delivery**	
Module Type	core			☒ **Theory** ☒ **Lecture** ☒ **Lab** # **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code					
ECTS Credits	**8**				
SWL (hr/sem)	**200**				
Module Level		1	**Semester of Delivery**		1
Administering Department			**College**		
Module Leader	Yusra Majjed Al-shaker		**e-mail**	Yusra Majjed@uomosul.edu.iq	
Module Leader's Acad. Title		أستاذ مساعد	**Module Leader's Qualification**		
Module Tutor	Mohammed Saadallah Younus Lena nofel mohammed salih Abeer Saleh Atiya Mustafa Amer Dhannoon		**e-mail**	Mohammed.Younus@uomosul.edu.iq	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules			
Prerequisite module	Chem 1	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	1- Learning the Priciples of Analytical Chemistry 2- Studying principles of Quantitative Analysis.. 3- Studying of Quantitative analysi. 4- Studying equation that used in preparation solution used in chemical analysis. 5- Studying types of volumetric titration in chemical analysis. 6- Studying principles of spectrophotometric analysis. 7- Studying deviations.
Module Learning Outcomes	1- knowing about principles of qualitative analysis. 2- knowing about principles of qualitative analysis. 3- knowing about principles of quantitative analysis. 4- knowing about equation that used in preparation solution used in chemical analysis. 5- knowing about types of volumetic titration used in chemical analysis. 6- knowing about prenciples of spectrophotometric analysis. 8- knowing deviations.
Indicative Contents	Analytical chemistry is devided to two main parts; qualitative and quantitative analysis. Qualitative analysis includes knowing the composition of the sample without knowing its concentration.quantitative analysis include knowing sample compotion and its concentration. Quantitative analysis incude two main method ; cassical method and instrumental method. Classical methods done by using glass equipments. Quantitative analysis done by instrumenal device such as spectrophotometry and chromatography and anothers.

Learning and Teaching Strategies	
Strategies	Strategies of Teaching is knowing prenciples of chemical analysis and methods and apparatus used and instruments nad techneques used.

Student Workload (SWL)			
Structured SWL (h/sem)	120	**Structured SWL (h/w)**	8
Unstructured SWL (h/sem)	80	**Unstructured SWL (h/w)**	5
Total SWL (h/sem)	200		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	5	15% (15)		
	Assignments	5	15% (15)		
	Report	5	10% (10)		
Summative assessment	**Midterm Exam**	3 hr	10% (10)	7	
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Module Name	**SSWL(hr/W)**						**Exam (hr/Sem)**	**SSWL (hr/Sem)**	**USSWL (hr/Sem)**	**SWL (hr/Sem)**	**ECTS**
	CL (hr/W)	**Lect (hr/W)**	**Lab (hr/W)**	**Pr (hr/W)**	**Tur (hr/W)**	**SEM (hr/W)**					
Chemistry 2 (Analytical Chemistry) 1st Class	**4**	**1**	**2**		**1**		**3**	**120**	**80**	**200**	**8**
	60 (4/15)	**15 (1/15)**	**30 (2/15)**		**12 (1/12)**		**3**				

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Intoduction to analytical chemistry and Types of analytical chemistry
Week 2	Volumetric analysisand end point +
Week 3	Learning concentration , Molarity , Normality , ppm , % , + Quiz
Week 4	Type of reaction used in voumetric analysis and Acid – base titration + Quiz+ **Assignments**
Week 5	Oxidation – reduction titration + Quiz+ **Assignments**
Week 6	Precepitation titration + Quiz
Week 7	Mid-term Exam
Week 8	Complex titration
Week 9	Spectrophotometry + Quiz
Week 10	Beer – lambert equation
Week 11	Deviations + Report+ Quiz
Week 12	Chromatography +**Assignments**
Week 13	Atomic absorbtion+ **Assignments**
Week 14	Phlorecence and phosphorecence + **Assignments**
Week 15	IR techneque.
Week 16	final Exam

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 1	Introdution to analytical chemistry
Week 2	Detemination molaity of sodium hydroxide
Week 3	Detemination molaity of Hydrochloric acid+ report
Week 4	Detemination molaity of sodium carbonate and sodium bicarbonate+ report
Week 5	Detemination molaity of sodium chloride (mohr method)

Week 6	Detemination molaity of $AgNO_3$(volhard method)+ report
Week 7	Detemination molaity of sodium chloride (fajan method)
Week 8	Detemination molaity of $KmnO_4$
Week 9	Detemination of Co using spectrophotometry+ report
Week 10	Detemination ofNi using spectrophotometry
Week 11	Detemination ofFe using spectrophotometry + report
Week 12	Analysis of water using atomic absorbtion 1
Week 13	Analysis of water using atomic absorbtion 2
Week 14	Determination of some chemicals in different samples

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	**اسس الكيمياء التحليلية.** **د.مؤيد قاسم العباجي د. ثابت سعيد الغبشة**	
Recommended Texts	**التحليل الوصفي والحجمي.** **د. ثابت سعيد الغبشة د. مؤيد قاسم العباجي**	
Websites		

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

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Environmental Science**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code					
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	1 (Undergraduate)		**Semester of Delivery**	1	
Administering Department	Type Dept. Code Department of Environmental Technologies		**College**	Type College Code College of Environmental Science and Technologies	
Module Leader	Dr.Eman A.M. Al-Jawadi Dr. Mayada Ahmed Al-Taii		**e-mail**	emanaljawadi@uomosul.edu.iq maysbio55@uomosul.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D./Chemistry Science	
Module Tutor			**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	Course of ecology deals with the interactions between environmental factors and organisms, provides fundamental properties of the population ecology and interspecific relationships, and deals with the concept of communities and ecosystems. Distinct emphasis is on describing the structural, spatial and temporal dynamics within each level of ecological level (species, populations, communities, ecosystem, biome, the biosphere) as well as between different levels (e.g. the impact of changes in ecosystem characteristics of biological communities and population dynamics of organisms which compose such a community). The discussed issues are given in a very systemic way, which allows students a comprehensive understanding of the direct and indirect reciprocally but inseparable material, energy and information interactions between biotic and abiotic environmental factors. Course content allows students to develop a critical attitude towards anthropogenic-induced changes in ecological systems (from organism to biosphere), and enables them to apply the obtained new knowledge for development of sustainable management with ecological systems.
Module Learning Outcomes	Knowledge and understanding: Students will gain the ability to connect different levels of abiotic systems, they will understand their mutual and reciprocal interactions which will enable them to identify responses of ecological systems (from species to ecosystem) to changes of environmental factors. The acquired knowledge will enable them to design measures to reduce or eliminate undesirable impacts and to development new approaches that will help to improve the state of affected ecological systems. By this means, they will take into account the contents of other complementary courses in order to address ecological problems holistically and to develop their appropriate systemic solutions.
مخرجات التعلم للمادة الدراسية	The content of the curriculum integrates the sciences surrounding the environment and promotes the topics of biology, chemistry, geology, hydrology and their relationship with the environmental environment.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Curriculum content deals with ecology holistically and with each of the ecological levels (species, communities, communities, ecosystem, biome, biosphere) incorporating and promoting topics of biology, chemistry, geology, and hydrology.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6 (93/15)

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.8 (57/15)
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)	3,5,7,12,14	LO #1, 2,3-4, 5-6,7-11 12and 13
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Tutorial	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	8	LO # 1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Module Name	SSWL(hr/W)						Exam (hr/Sem)	SSWL (hr/Sem)	USSWL (hr/Sem)	SWL (hr/Sem)	ECTS
	CL (hr/W)	Lect (hr/W)	Lab (hr/W)	Pr (hr/W)	Tur (hr/W)	SEM (hr/W)					
Environmental Science 1st Class	**3**	**2**			**1**		**3**	**93**	**57**	**150**	**6**
	45 (3/15)	**30 (2/15)**			**15 (1/15)**		**3**				

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Intoduction , Concept of ecology , Components of ecosystem , Types of ecosysetm**
Week 2	**Ecological Balance ,Environmental problems, history and sustainability**
Week 3	**Energy / productivity /Ecological efficiences and their relationship to the environmental system. Quiz1**
Week 4	**Succession.**

Week 5	**Food chain and food web ,Ecological pyramids.Quiz**
Week 6	**Biogeochemical cycles in the environment and human influence on them…1**
Week 7	**Biogeochemical cycles in the environment and human influence on them..2. . Quiz**
Week 8	**Midterm exam**
Week 9	**Limiting factors and tolerance levels**
Week 10	**Ecological factors & indicators**
Week 11	**Biodiversity**
Week 12	**Terrestrial, aquatic, marine ecology and communities Quiz**
Week 13	**Environmental problems .**
Week 14	**Environmental problems and the negative effects of the resulting pollutants on living organisms and the proposed methods of dealing with them…1. Quiz**
Week 15	**the negative effects of the resulting pollutants on living organisms and the proposed methods of dealing with them…2.**
Week 16	**Final exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	• Smith, T. S., Smith, R. L., 2013. Elements of Ecology (8th edition), International edition, Benjamin Cummings, San Francisco, Boston, 688 str. **Catalogue** **E-version** • Odum, E. P., 2005. Fundamentals of Ecology – 5th edition. 624 str. **E-version** • Tome, D., 2006. Ekologija. Tehniška založba Slovenije 344 str. **Catalogue**	
Recommended Texts	• Tarman, K., 1992. Osnove ekologije in ekologije živali. DZS, Ljubljana, 547 str. **Katalog** • Selected scientific articles discussed as part of seminar exercises	
Websites		

Grading Scheme
مخطط الدرجات

Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Computer science**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	UOM13211				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Environmental Technology		**College**	environmental science and technology	
Module Leader	Muthaina . A. Mustafa		**e-mail**	Muthaina@uomosul.edu.iq	
Module Leader's Acad. Title	teacher		**Module Leader's Qualification**	M.S.C.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Raghad H.Saeed		**e-mail**	Raghad.h.alshekh@uomosul.edu.iq	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	**enhancing the student's knowledge of computers, their various applications, their software, which is used in a variety of industries, and the most recent technological advancements.** **The fundamentals of computers, common programs, viruses, and how to get rid of them are covered in this course.** **How to set up and operate office software and service packages.** **how to use email and the internet.** **The promotion of self-education, which enables the teacher to account for individual differences and ultimately improves the quality of learning and teaching, is one of the goals of using technology in the classroom.** **the capacity to fulfill educational objectives involving skills, such as learning, computer, and problem-solving** **Students are drawn to it because it is an interesting topic.** **because it is a fun way to break the student's monotonous memorization and work routine.** **It frees the teacher from spending time and effort on routine educational tasks, allowing him or her to devote more time and energy to designing learning situations and experiences that support the intellectual and social growth of students' personalities.** **creating programs that are simple to adapt to student needs** **presenting the scientific material, identifying students' areas of weakness, and providing corrective exercises that are appropriate for their needs** **accelerating learning and improving performance** **They aid in representing the difficult to provide real world**
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**1- a thorough explanation of computer fundamentals, including a breakdown of hardware, software, and storage media.** **2- An overview of Windows 0.8, including its features and windows, main screen elements, taskbar, mouse, and how to work with different programs and files.** **3- An overview of Windows 0.8, including its features and windows, main screen elements and the taskbar, as well as the mouse, keyboard, numerical systems, and how to interact with various applications and files.** **4- An overview of the main and submenus, features, and system of Microsoft Word 2016.** **1- Overview of Microsoft Excel 2016, including a look at its features and instructions for adding worksheets.**
Indicative Contents المحتويات الإرشادية	**The course covers the following topics over the course of:** **an introduction to computers, their types, and the evolution of their generations; setting up a calculator and explaining its fundamental components; defining the hardware and software components of computers; types of storage media; and .viruses, their types, and how to avoid them15 hours**

	Introduction to Windows 0.8 and its features, windows, taskbar, mouse, and keyboard, as well as instructions on how to work with various programs and files .(5 hours) **The Microsoft Word 2016 system and its features are introduced, along with the main and submenus (file, home page, insert), main menus (page layout, references, correspondence, review), and main menus (view, Introduction to the Microsoft Excel 2016 system, its features, worksheets, and methods for inserting them (15hours).** **Introduction to the Microsoft Excel 2016 system, its features, worksheets, and methods for inserting them (15 hours)** **. Discussion of the different types of data used in the program and methods for .dealing with cells** **Using mathematical and engineering equations and functions, using the most popular statistical functions, dealing with various graphs and graphs, and .representing data (15 hours)** **.Use of logical functions and conditional functions (5 hours)** **The Internet, including the World Wide Web and its elements, as well as e-mail, its .features and settings. Gmail, Yahoo, and college emails took (5 hours)**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**The development of the computer and the Internet has had a significant impact on educational systems around the world because they are practical tools that can be used to enhance the educational process by continuously diversifying information and its modernity, diversifying the possibilities, developing communication skills in teams, fostering a climate of freedom in the classroom, and utilizing open education in universities. the ability to obtain current research from universities and research centers, the use of the Internet to publicize conferences and educational activities.**

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	2
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)	2, 5	LO #1 and 4
	Assignments	3	20% (20)	4,7,12	LO # 2, 4 and 5
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	0	0	0	0
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-4
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	المفردات المعطاة
Week 1	**An introduction to computers and their types and the evolution of their generations, the installation of the calculator and its basic parts**
Week 2	**Clarification of the physical and software parts of the computer, storage media and their types, viruses and their types, and how to get rid of them**
Week 3	**Introduction to Windows 0.8 and its features and windows, components of the main screen and taskbar, mouse, keyboard, numeric systems, and how to deal with different programs and files**

Week 4	**Introduction to Microsoft word 2016 and its features and main and sub menus (file, home page, insert)**
Week 5	**Microsoft word 2016 and the main menus (page layout, references, correspondence, revision)**
Week 6	**Microsoft word 2016 and the main menus (display, design, layout)**
Week 7	**Introduction to Microsoft Excel 2016, its features, worksheets, and how to include them.**
Week 8	**Types of data used in the program and how to deal with cells**
Week 9	**How to insert different tables, and how to use and deal with pivot tables.**
Week 10	**How to represent data and deal with different graphics and charts.**
Week 11	**The use of mathematical and engineering equations and functions.**
Week 12	**Use of the most common statistical functions.**
Week 13	**The use of conditional functions, the use of logical functions.**
Week 14	**Communication networks, their types, advantages and disadvantages, the division of computer networks according to the carrier medium**
Week 15	**The Internet: the World Wide Web and its components, protocols, websites, services and engines. E-mail, its uses, features, how to configure it, and create a G mail account, a university email**
Week 16	**Preparatory week before the final exam**

Grading Scheme مخطط الدرجات

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	**An introduction to computers, their generations, types, and their basic parts.**
Week 2	**How to install and use office packages and service software, mouse, keyboard**
Week 3	**Windows 0.8 system, its features and windows, the components of the home screen and the taskbar, and how to deal with various programs and files**
Week 4	**Microsoft word 2016 system and its main and sub menus in detail**
Week 5	**Microsoft word 2016 How to print different files and insert tables**
Week 6	**Microsoft Excel 2016 system, its windows and worksheets, how to insert graphs, data types, and how to use them.**
Week 7	**Microsoft Excel 2016 system and arithmetic, engineering and statistical functions.**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**لايوجد**	Yes
Recommended Texts	**1 - تعلم تطبيقات الحاسوب الاساسية / للدكتور محمد عبد اللطيف ابراهيم** **2 - دورات في كفاءة الحاسوب /مركز الحاسبة الالكترونية – جامعة الانبار**	**No**
Websites	**1- تعلم استخدام الحاسوب / مكتبة منبعث للدراسات والاستشارات العلمية on line** **2- اساسيات الحاسوب/ مكتبة نور /للدكتور احمد محمد ابراهيم online** **Http:// Courses-Lectures.com**	

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	Human rights and democracy			**Module Delivery**	
Module Type	Support			☒ **Theory** ☒ **Lecture** ☒ **Lab** **Tutorial** **Practical** **Seminar**	
Module Code					
ECTS Credits	3				
SWL (hr/sem)	75				
Module Level		1	**Semester of Delivery**		2
Administering Department			**College**		
Module Leader	Yasir Shakir Mahmood		**e-mail**	yasirshakir.m@uomosul.edu.iq	
Module Leader's Acad. Title		Teacher/ Doctor	**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		30/06/2023	**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 Aims أهداف المادة الدراسية	1. Introducing human rights and their general characteristics. 2. Human rights in Islamic law. 3. Fourth: Types of human rights, and new human rights. 4. The rights of weak and vulnerable groups. 5. Human rights in the Iraqi constitution of 2005, and guarantees of human rights. 6. The concept of democracy, its content, the characteristics of the democratic system, and its forms. 7. Contemporary political systems, the presidential and parliamentary system. 8. The democratic experience in Iraq and the problems it faced.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Explanation of human rights in terms of definition and characteristics. 2. Clarification of human rights in ancient civilizations. 3. What is the role of the Code of Hammurabi in guaranteeing human rights? 4. Discuss and learn about human rights in Islamic law. 5. Explain the right to a clean environment of modern human rights within the scope of the third generation. 6. Mention the types of civil, political, economic, social and intellectual human rights. 7. The rights of vulnerable or vulnerable groups, such as children, women, the disabled, and the indigenous population. 8. Statement of human rights in the Iraqi constitution for the year 2005, and the guarantees of these rights. 9. Human rights guarantees and their protection at the national and international levels. 10. Discuss the content and content of democracy. 11. Clarifying the forms and images of democracy, direct democracy, indirect (parliamentary) democracy, and semi-direct democracy. 12. Clarification of contemporary political systems, the presidential system, and the parliamentary system. 13. Identify the problems faced by the democratic experiment in Iraq.
Indicative Contents المحتويات الإرشادية	The indicative content included the following. The indicative content included the following. Part A - Human Rights: The concept of human rights and their characteristics, human rights in ancient civilizations, human rights in divine laws. [6 hours] Human rights sections, types of human rights, civil, political, economic, social and intellectual rights. [3 hours] New Human Rights, Minority Rights, Rights of Vulnerable and Oppressed Groups [3 hours]

	Human rights in the Iraqi constitution of 2005. [3 hours] Human rights guarantees and their protection at the national level [3 hours Human rights guarantees and their protection at the international level. [3 hours] Exam half course + Part B - Democracy: Definition of democracy, discussion of the content and content of democracy, goals of democracy. [3 hours] Clarification of forms and images of democracy, direct democracy, election methods: direct and indirect election .. [6 hours Indirect (parliamentary) democracy, semi-direct democracy and its manifestations, popular referendum, popular objection, popular motion, the right of voters to be excluded. Parliament, the right to dissolve the People's Assembly, the right to dismiss the President of the Republic (a popular accusation). [3 hours] Contemporary political systems include: first: the presidential system, and second: the parliamentary system, and the distinction between the presidential system and the parliamentary system. [6 hours] The democratic experience in Iraq and the most important issues that can be referred to in the democratic transition in it, and the most important problems that the democratic experience faced in Iraq. [6 hours End-of-course exam [2 hours]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in introducing this unit of study is to encourage students to engage in understanding the subject of human rights while improving and expanding their thinking skills at the same time. This is achieved through course contents that include everything related to human rights and democracy in a theoretical and streamlined manner.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	47	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	28	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	The concept of human rights and their characteristics.
Week 2	human rights in ancient civilizations, human rights in divine laws.
Week 3	Human rights divisions, types of human rights, civil, political, economic, social and intellectual rights.
Week 4	New human rights, human right to a clean environment and sustainable development. Minority rights, the rights of weak and vulnerable groups.
Week 5	Human rights in the Iraqi constitution of 2005.
Week 6	Human rights guarantees and their protection at the national level.
Week 7	human rights guarantees and their protection at the international level.
Week 8	Exam
Week 9	Definition of democracy, discussion of the content and content of democracy, goals of democracy.

Week 10	Forms and forms of democracy, direct democracy, and indirect (parliamentary) democracy, election methods: direct election and indirect election, semi-direct.
Week 11	democracy and its manifestations, popular referendum, popular objection, popular proposal, the right of voters to dismiss their representative, the right to popular dissolution of the parliament, the right Isolation of the President of the Republic (popular impeachment).
Week 12	Contemporary political systems include: first: the presidential system, second: the parliamentary system, and the distinction between the presidential system and the parliamentary system
Week 13	The democratic experience in Iraq and the most important issues that can be referred to in the democratic transition in it.
Week 14	and the most important problems that the democratic experience faced in Iraq.
Week 15	**Comprehensive review of the article.**
Week 16	**End of course exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	nothing
Week 2	nothing
Week 3	nothing
Week 4	nothing
Week 5	nothing
Week 6	nothing
Week 7	nothing

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	r.. Muhammad Yunus Al-Sayegh, Democracy and Human	Yes

	Rights, Dar Ibn Al-Atheer for Printing and Publishing, University of Mosul, 2012.	
Recommended Texts	Dr.. Orouba Jabbar Al-Khazraji, International Human Rights Law, 2nd Edition, Dar Al-Thaqafa for Publishing and Distribution, 2012.	No
Websites	Declaration of the Rights of the Man and of the Citizen of 1789. https://www.google.com/search?gs_ssp=eJzj4tDP1TcwsjTKNWD00rix9mbTzY6bTQo3lt9sAeK2G5tBpMLNDpDAzVYQfWP7zTYAr0weIw&q	

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

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**MATHEMATICS II**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code					
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		Bachelor's Degree	**Semester of Delivery**		3
Administering Department		Environmental Tech.	**College**	Environmental Science and Technology	
Module Leader	Marwan Jameel		**e-mail**	marwan.jameel@uomosul.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor	Name		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		01/06/2023	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Mathematics I	**Semester**	1
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Introduce to matrix because the Matrices have wide applications in engineering, physics, economics, and statistics as well as in various branches of mathematics. Matrices also have important applications in computer graphics, where they have been used to represent rotations and other transformations of images. 2. The aim of this course is to give an introductory course on basics concepts of multi objective function analysis, to teach limit, partial derivative, multi-integral concepts and their applications. 3. To develop problem solving skills and understanding of Advance calculus theories through the application of techniques.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. A student defines some mathematical concepts which are essential in his/her field, 2. Gains the skill of interpreting some interrelations among these concepts, 3. Uses mathematical concepts in solving certain types of problems. 4. Calculates partial derivatives of functions. 5. Calculates multiple integrals and do applications of multiple integration.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Matrices and Determinants, Addition and subtraction of matrices.[15 hrs] Multiplication and transpose of matrices Adjoint of a square Matrix.[10 hrs] Inverse of a square Matrix.[10 hrs] Gramer's rule.[4 hrs] Vectors in plane, Vectors in space Dot and cross product, Lines and planes in three-dimensional space.[16 hrs] Partial derivatives, Chain rule.[12 hrs] Double integration rectangular coordinate. Triple integrals in rectangular coordinates.[13 hrs] Infinite serie,Sequences and series-convergence and divergence Convergence tests for series- Integral test, comparison test, the root and ratio test, Alternating series , Taylor and Maclaurin series. [10 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Activities are given in detail in the section of "Assessment Methods and Criteria" and "Workload Calculation" The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students in order to introducing the basic topics of analysis, to teach the concepts of limit, derivative, integration and their applications.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	90	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	60	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/ Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5, 11	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	Per week	All
	Attendance	All	10% (10)	Per week	All
	Projects / Lab.	1	5% (5)	Continuous	All
	Report and seminar	1	5% (5)	Continuous	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hrs.	20% (20)	7	LO # 1-7
	Final Exam	2 hrs.	40% (40)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Matrices andDeterminants, Addition andsubtraction of matrices
Week 2	Multiplication andtranspose of matricesAdjoint of a squareMatrix
Week 3	Inverse of a squareMatrix
Week 4	Gaussian eliminations and linear system
Week 5	Gramer's rule
Week 6	Midterm examVectors in plane, Vectors in space
Week 7	Dot and cross product, Lines and planes inthree-dimensional space
Week 8	Partial derivatives, Chain rule
Week 9	Double integration rectangular coordinate
Week 10	Triple integrals in rectangular coordinates
Week 11	Midterm exam, Infinite series
Week 12	Sequences
Week 13	series-convergence and divergence
Week 14	Convergence tests for series- Integral test, comparison test,
Week 15	the root and ratio test, Alternating series ,Taylor and Maclaurin series
Week 16	**Final exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Thomas, Calculus and Analytic Geometry, Addison-Wesley 1996.	Yes
Recommended Texts	F. B. Hildebrand, Advanced Calculus for Applications, 2nd Edition, Prentice-Hall, 1976. 4.	No
Websites	https://www.youtube.com/playlist?list=PLF797E961509B4EB5	

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

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Soil physics**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	**UoB12345**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	2		**Semester of Delivery**	2	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	عبدالستار جبير زين مهند قاسم الجميلي		**e-mail**	E-mail	
Module Leader's Acad. Title	مدرس مدرس مساعد		**Module Leader's Qualification**	دكتوراه ماجستير	
Module Tutor	Name (if available)		**e-mail**	E-mail: sattarjubair@uomosul.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail: aljumailymuhannad@uomosul.edu.iq	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

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

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
أهداف المادة الدراسية	التعرف على الخصائص الفيزيائية للتربة وطرق اخذ العينات وتهيئتها وإجراء بعض الاختبارات الفيزيائية والتعامل مع مختبرات التربة
مخرجات التعلم للمادة الدراسية	في نهاية التدريس، يكتسب الطالب معرفة المبادئ الفيزيائية للتربة ، ويكون الطالب قادرًا على تقدير المتغيرات الفيزيائية الرئيسية للتربة ، ومنهأخذ عينات التربة ، الكثافة . ، النفاذية ، المسامية، قوام التربة ، رطوبة التربة ،

اللون ودرجة الحرارة ، هواء التربة والتهوية.	
يتضمن المحتوى الإرشادي ما يلي: 1. المبادئ العامة لفيزياء التربة وخصائص أطوار التربة للصورة الصلبة والسائلة والغازية ، (إجمالي وحدة التدريس: 10 ساعات) 2. طرق أخذ عينات التربة وإيجاد الكثافة الظاهرية والكثافة الحقيقية للتربة، (إجمالي وحدة التدريس: 10 ساعات) 3. ماء التربة ، المسامية ونفاذية التربة (إجمالي وحدة التدريس: 15 ساعة) 4. تركيب التربة، وصف مقطع التربة ، نماذج مبسطة ، مجموعات التربة ، قشر التربة ، نسجة التربة (إجمالي وحدة التدريس: 15 ساعة) 5. الغيض ، هواء التربة والتهوية ، درجة حرارة التربة ، اللون ، الرطوبة (إجمالي وحدة التدريس: 20 ساعة)	المحتويات الإرشادية

استراتيجيات التعلم والتعليم	
تتمثل الاستراتيجية الرئيسية التي سيتم تبنيها في تقديم هذه الوحدة في معرفة الطالب بالخصائص الفيزيائية للتربة وتأثيرها على التربة ومدى إمكانية تحديدها من خلال استخدام مختبرات التربة وعرض نتائج المختبر والتعامل معها وعلاقتها بالجانب البيئي.	الاستراتيجيات

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**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)	4, 9	
	Assignments	2	10% (10)	5, 10	
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	12	
Summative assessment	Midterm Exam	2hr	10% (10)	7	
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	مقدمة عامة إلى فيزياء التربة
Week 2	تركيب التربة
Week 3	قوام التربة
Week 4	نسجة التربة
Week 5	تهوية وهواء التربة
Week 6	انضغاط التربة
Week 7	امتحان نصف الفصل
Week 8	الكثافة الظاهرية
Week 9	الكثافة الحيقية
Week 10	المسامية
Week 11	نفاذية التربة
Week 12	ماء التربة
Week 13	حرارة التربة
Week 14	مراجعة
Week 15	مراجعة
Week 16	**امتحان نهاية الفصل**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي للمختبر	
	Material Covered
Week 1	مختبر 1: مقدمة عن فيزياء التربة العملي
Week 2	مختبر 2: طرق اخذ العينات
Week 3	مختبر 3: تهيئة العينات
Week 4	مختبر 4: نسجة التربة 1
Week 5	مختبر 5: نسجة التربة 2
Week 6	مختبر 6: الوزن النوعي للتربة
Week 7	امتحان نصف الفصل
Week 8	مختبر 8: الكثافة الظاهرية
Week 9	مختبر 9: الكثافة الحقيقية
Week 10	مختبر 10:المسامية

Week 11	مختبر 11: نفاذية التربة
Week 12	مختبر 12:رطوبة التربة
Week 13	مختبر 13:لون التربة
Week 14	مختبر 14: مراجعة
Week 15	مختبر 15:مراجعة
Week 16	امتحان نهاية الفصل

مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	فيزياء التربة ، د.هشام محمود حسن تحليل التربة والنبات، جون راين و عبد الرشيد	نعم
Recommended Texts	فيزياء التربة، ا.م.د. ماركو بيتيلي	لا
Websites	https://www.agro-lib.site/2022/10/blog-post_5.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.

وصف المادة

التعرف على الخصائص الفيزيائية للتربة وطرق اخذ العينات وتهيئتها وإجراء بعض الاختبارات الفيزيائية والتعامل مع مختبرات التربة . وفي نهاية التدريس، يكتسب الطالب معرفة المبادئ الفيزيائية للتربة ، ويكون الطالب قادرًا على تقدير المتغيرات الفيزيائية الرئيسية للتربة ، ومنهأخذ عينات التربة ، الكثافة . ، النفاذية ، المسامية، قوام التربة ، رطوبة التربة ، اللون ودرجة الحرارة ، هواء التربة والتهوية. ويتضمن المحتوى الإرشادي ما يلي : 1. المبادئ العامة لفيزياء التربة وخصائص أطوار التربة للصورة الصلبة والسائلة والغازية . 2. طرق أخذ عينات التربة وإيجاد الكثافة الظاهرية والكثافة الحقيقية للتربة. 3. ماء التربة ، المسامية ونفاذية التربة . 4. تركيب التربة، وصف مقطع التربة ، نماذج مبسطة ، مجموعات التربة ، قشر التربة ، نسجة التربة . 5. الغيض ، هواء التربة والتهوية ، درجة حرارة التربة ، اللون ، الرطوبة. وتتمثل الاستراتيجية الرئيسية التي سيتم تبنيها في تقديم هذه الوحدة في معرفة الطالب بالخصائص الفيزيائية للتربة وتأثيرها على التربة ومدى إمكانية تحديدها من خلال استخدام مختبرات التربة وعرض نتائج المختبر والتعامل معها وعلاقتها بالجانب البيئي.

MODULE DESCRIPTION FORM

Module Information					
Module Title	**Environmental statisticI**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code					
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	2		**Semester of Delivery**	1	
Administering Department	Environmental Technology		**College**	environmental science and technology	
Module Leader	Muthaina . A. Mustafa		**e-mail**	Muthaina@uomosul.edu.iq	
Module Leader's Acad. Title	teacher		**Module Leader's Qualification**	M.S.C.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	**Statistics is considered one of the important means in scientific research, whose methods and tools are included in various fields of life, so that it is qualified to have a basic share in the work of countries, institutions and organizations on which economic and social development depends globally and locally by relying on the results it provides in a specific field. From this standpoint comes the importance Statistics is one of the important means that uses its rules, laws and different methods in the process of collecting, summarizing, presenting and analyzing data and interpreting results. Therefore, we seek to develop the student's skills and enrich him with information about statistics, its symbols, tools, various uses, and its software used in various fields.** **As for the environmental field, our goal was to harness statistical tools in solving environmental problems by taking samples of water or air pollution and even soil, analyzing them statistically, interpreting the results and presenting appropriate solutions.manually and compare the results practically through the use of ready-made statistical programs, including the SPSS program, discussing and interpreting the results, as well as enriching the student with modern information, keeping pace with the rapid technological development in this field, and seeing the latest findings in the field of data science and artificial intelligence.**
Module Learning Outcomes	1- **using the student to the importance of statistics and its uses in various sciences and its symbols** **2- Focusing on the importance of statistics and its various uses in the environmental field** **3- Methods of statistical data collection, graphic representation and tabular presentation.** **4- General steps to create a frequency distribution table.** **5- Frequency and cumulative distributions.** **6- Measures of central tendency for classified and ungrouped data.** **7- Measures of dispersion for classified and ungrouped data.** **8- Simple, partial and multiple correlation and adjective correlation** **9-Simple and multiple regression**
Indicative Contents	**Indicative Contents** **Indicative Contents The indicative content includes the following:** **Introduction to statistics, its uses, divisions and development, the most important statistical symbols used, methods of collecting statistical data, tabular presentation and graphical implementation, general steps for creating a frequency distribution table (10 hours).** **Clustered distributions and graphical representation Frequency distributions and their types (5 hours)** **Measures of centering for classified and non-classified data (arithmetic mean, geometric mean, squared mean), Measures of centering for classified and non-classified data (harmonic mean, mode, median) (15 hours).** **Measures of dispersion for classified data Unstipulated (mean deviation,**

	variance, standard deviation), standard score and coefficient of variation, skewness coefficient and kurtosis coefficient (10 hours). **Simple and multiple correlation, partial correlation, and trait correlation (15 hours).** **Simple regression and multiple regression (5 hours) .**

Learning and Teaching Strategies	
Strategies	**Encouraging students to participate in solving exercises, discussing the results, interpreting them scientifically and linking them to reality, motivating students to include some pollution problems and working to find appropriate statistical solutions for them through the use of statistical programs and comparing the results of the practical side with the theoretical one to consolidate theoretical concepts .**

Student Workload (SWL)			
Structured SWL (h/sem) **The regular academic load of the student during the semester**	64	**Structured SWL (h/w)** **The student's regular study load per week**	4
Unstructured SWL (h/sem) **The irregular academic load of the student during the semester**	36	**Unstructured SWL (h/w)** **Irregular academic load for the student per week**	2
Total SWL (h/sem) **The total academic load of the student during the semester**	100		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	6 , 10	LO #6 and 7
	Assignments	3	20% (10)	5, 10,13	LO #6, 7 and 8
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	0	0	0	0
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 3-9
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	given vocabulary
Week 1	Introduction to statistics, its uses, divisions, development, and the most important statistical codes used
Week 2	Methods of statistical data collection, tabular presentation and graphic implementation
Week 3	General steps to create a frequency distribution table
Week 4	Clustered distributions and graphical representation, frequency distributions and their types
Week 5	Centering measures for grouped and ungrouped data (arithmetic mean, geometric mean)
Week 6	Centering measures for tabulated and ungrouped data (square mean, harmonic mean)
Week 7	Centering measures for grouped and ungrouped data (modal, median)
Week 8	Measure of dispersion for grouped and ungrouped data (mean deviation, variance, standard deviation)
Week 9	Standard score and coefficient of difference
Week 10	Torsion modulus and flattening coefficient
Week 11	Simple and multiple correlation
Week 12	partial correlation
Week 13	adjective correlation
Week 14	simple regression
Week 15	Multiple Regression
Week 16	Preparatory week before the final exam

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 1	**An introduction to the SPSS statistical program, how to install it, its uses and characteristics**
Week 2	**Initializing input files, explaining program windows, using the view window, clarifying its commands, and applying examples**
Week 3	**How to use the Data window and apply its commands, supported by illustrative examples**
Week 4	**How to use the Transformation window and apply its commands, supported by illustrative examples**
Week 5	**Apply centering and dispersion measures through the Analyze window**
Week 6	**Ensure the normal distribution of the data and conduct a sample sufficiency test for the data through the Analyze window**
Week 7	**Apply simple and multiple correlation and interpret results through the Analyze window**
Week 8	**Apply partial correlation and trait correlation and interpret the results through the Analyze window**
Week 9	**Apply simple and multiple regression and interpret the results through the Analyze window**

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	**Introduction to statistics / dr.Kashia Mahmoud Al-Rawi**	Yes
Recommended Texts	**1-Introduction to descriptive and inferential statistics / Dr. AZ Hassan Abdel-Fattah** **2- Analytical Statistics with SPSS Software Applications / Dr. Nabil Juma Saleh Al-Najjar**	No
Websites	**1-https://www. Gulfup.com/?EJrm4x**	

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	Fluid 1			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code					
ECTS Credits					
SWL (hr/sem)	**150**				
Module Level	2		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Dr. Tahseen Ali Gelmirn		**e-mail**	tahssenali1967@uomousl.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**	1.0	

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

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To develop the student's skills to understand the principle of fluids and units of measurement and to deal with them through environmental systems. 2. To understand the methods of dealing with fluids and their properties. 3. This course deals with the calculation of the forces exerted by fluids on submerged and floating objects. 4. Learn about fluid pressure measuring devices and methods for calculating the pressure applied by the fluid.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Learn about the concept of fluids. 2. Identify the basic units for measuring all fluids in the international unit measurement systems. 3. Describe fluid properties. 4. Identify the methods of analyzing the forces exerted by fluids on submerged and floating objects. 5. Using different devices to measure pressure in fluids practically and calculate fluid pressure theoretically. 6. Learn about the law of continuity of liquids and the calculation of discharge. 7. Learn about Bernoulli's equation and its applications. 8. Learn about the Venturi meter and its applications.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following.Learn about the concept of fluids and their properties and how to calculate the mass density, weight density and specific weight of fluids, identify the standard events of fluids in the international measurement systems, calculate the forces applied to the surfaces immersed in the fluid vertically, horizontally or inclined, or if these surfaces are curved, calculate the forces exerted on Objects floating on a fluid. [25 hrs] Understanding the concept of pressure in fluids, the devices used to measure pressure in practice, and the laws for calculating pressure in fluids.[24hrs] Identifying the devices for calculating losses in pipes practically in the laboratory and the laws and equations used in calculating them, using the devices and special methods for measuring discharge in the laboratory and identifying the laws and equations for calculating it theoretically. [20hrs] Designing pipe networks, calculating their diameters, methods of connecting these networks, calculating the fluid velocity inside the pipe, the amount of pressure applied to it practically in the laboratory, and the theoretically used laws and equations. [27hrs] Revision problem classes [6 hrs]

	The main strategy that will be adopted in presenting this unit is to encourage students to participate and interact with the material through the course, while improving, expanding, and nurturing thinking skills, and to train students in scientific and logical thinking methods and to learn about the concept of fluids. This will be achieved through the scientific material of the course, interactive educational programs and its practical and laboratory applications, and through the development of logical methods for scientific thinking and linking the scientific material and its application in practical life. This is done through identifying the fluid's physical characteristics such as mass density, weight density, specific weight, viscosity, surface tension property, identifying its units of measurement in the international measurement systems, getting acquainted with pressure measurement devices practically and learning to calculate pressure theoretically through mathematical theories and equations, and addressing To the forces affecting floating and submerged objects in fluids, how to analyze and calculate these forces, as well as identifying pressure and velocity analysis.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
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	15% (10)	3, 5 and 13	LO #1-2, 3-5 and 7-9
	Assignments	2	15% (10)	2, 5, 10 and 14	LO # 1-2, 3-5, 6-7 and 8-9
	Projects / Lab.				
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-6
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Fluid mechanic fundamentals, physical characteristic unit, density, weight density, specific gravity
Week 2	Viscosity, surface tension, capillarity
Week 3	Gauge pressure
Week 4	Manometer
Week 5	Force on submerged plane (vertical and horizontal)
Week 6	Force submerged on inclined plane
Week 7	Force submerged on curved plane
Week 8	**Mid-term Exam**
Week 9	Fluid dynamic, rate of flow
Week 10	Equation of continuity
Week 11	Bernoulli's equation
Week 12	Venturi meter
Week 13	Flow through an orifice
Week 14	Coefficient of discharge
Week 15	Coefficient of velocity, coefficient of contraction
Week 16	**Preparatory week before the finalExam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Center of pressure on immersed surface
Week 2	Lab 1: Center of pressure on immersed surface
Week 3	Lab 2: Forces due to jet impact on plates
Week 4	Lab 2: Forces due to jet impact on plates
Week 5	Lab 3: Bernoulli's equation
Week 6	Lab 3: Bernoulli's equation
Week 7	Lab 4: Reynolds number in pipe
Week 8	Lab 4: Reynolds number in pipe

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Fundamentals of Fluid Mechanics, Munson, Okiishi, Huebsch and Rothmayer تجارب في الهيدروليك ، مؤيد سعدالله	Yes
Recommended Texts	Fluid Mechanics, R. K. Rajput	
Websites		

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**English Language 2**			**Module Delivery**	
Module Type	**B**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	UOM2022				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level	1		**Semester of Delivery**	1	
Administering Department			**College**	College of Environmental Sciences	
Module Leader	Wissam Saeed		**e-mail**		
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	M.A.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To introduce Future tense. 2. To improve basic English skills (reading-writing-speaking- listening). 3. To support the highest degree of academic achievement by students who are not native speakers of English. 4. To determine how words function in a sentence. 5. To encourage students to express themselves in English. 6. This course introduces the principles of academic writing. 7. To introduce a number of important environmental terms.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Explain English verbs and how to use them. 2. Explain English adverbs and how to use them. 3. Explain English prepositions and how to use them. 4. Discuss conversation skills and encouraging students to participate in a dialogue. 5. Improve the pronunciation skills of students. 6. Introduce the main functions of English grammar. 7. Explain English modals. 8. Illustrate future tense. 9. Discuss regular and irregular verbs. 10. Identify Negatives and Question words. 11. Explain requests and offers. 12. Review types of sentences in English. 13. Explain requests and offers. 14. Enable students to read different scientific texts. 15. Introduce the most important environmental terms.

Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A- Parts of speech: Introduction - Identify the main parts of speech in English. – Verbs (definition, types, and use of adjectives) – Adverbs (definition, types, and use of adverbs) – Prepositions (definition, types, and use of verbs) [14 hrs] Part B- Conversation skills: Encouraging students to express themselves in English – to talk about science using English – improvement of pronunciation skills [4 hrs] Revision problem classes [2 hrs] Part C- English grammar: Introduction - future tense -Negatives – Questions- Requests and offers –Types of sentences in English – academic writing – environmental terminology [22 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Some effective strategies will be adopted in delivering this module such as, focusing on academic language, vocabulary exercises. Students will be given an opportunity to produce language through reading and speaking with receiving direct feedback to increase their comprehension and improve their language skills. This will be achieved through classes, group discussion, solving exercises, participation in conversations, interactive learning and writing 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	30	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	15	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1	10% (10)	5, 10	LO # 1, 2, ,3, 6, 8, 9, 10, and 13
	Online Assignments	1	10% (10)	2, 7, 12	LO # 2, 4 , 5, 10, 11, 12, 13 and 14
	Onsite Assignments	1	10% (10)	2, 7, 12	LO # 2, 4 , 5, 10, 11, 12, 13 and 14
	Projects / Lab.	0	0% (0)		
	Report	1	10% (10)	13	LO # 1, 6 and 12
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-6
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Explain English verbs and how to use them.
Week 2	Explain English adverbs and how to use them.
Week 3	Explain English prepositions and how to use them.
Week 4	Discuss conversation skills and encouraging students to participate in a dialogue.
Week 5	Improve the pronunciation skills of students.
Week 6	Introduce the main functions of English grammar.
Week 7	Mid-term Exam
Week 8	Explain English modals.
Week 9	Illustrate future tense.
Week 10	Discuss regular and irregular verbs.
Week 11	Identify Negatives and Question words.
Week 12	Explain requests and offers.
Week 13	Review types of sentences in English.
Week 14	Explain requests and offers.

Week 15	Environmental Terminology
Week 16	**The final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Liz and John Soars, 2010, Headway, Oxford University Press.	No
Recommended Texts	English Grammar in Use, Raymond Murphy , 2nd edition, Cambridge University Press.	No
Websites		

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Hydrology			**Module Delivery**	
Module Type	Core			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	UoB12345				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	1		**Semester of Delivery**	1	
Administering Department			**College**	Type College Code	
Module Leader	علي زين العابدين حيدر		**e-mail**	aalozeer@uomosul.edu.iq	
Module Leader's Acad. Title	مدرس		**Module Leader's Qualification**	دكتوراه	
Module Tutor	فرح خزعل سعيد		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	مادة علم الارض	**Semester**	1 or 2
Co-requisites module	علم المياه	**Semester**	2

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	• **فهم الدورة الهيدرولوجية:** تطوير فهم عميق للعمليات والتفاعلات التي تنطوي عليها دورة المياه في الطبيعة، بما في ذلك هطول الأمطار والتبخر والتكثيف والجريان السطحي والت رشيح وتدفق المياه الجوفية. • **فهم ا لأنظمة الهيدرولوجية :** المعرفة بمكونات وخصائص الأنظمة الهيدرولوجية ، مثل الأنهار والبحيرات ومصادر المياه الجوفية ومستجمعات المياه . يجب أن يتم فهم كيف تتفاعل هذه الأنظمة وتؤثر على توافر المياه وتوزيعها. • **قياس وتحليل البيانات الهيدرولوجية :** جمع البيانات الهيدرولوجية باستخدام تقنيات القياس المناسبة والأدوات. يجب عليهم أيضًا تطوير المهارات في تحليل وتفسير البيانات الهيدرولوجية ، بما في ذلك قياسات تدفق الجداول والانهار ومستويات المياه الجوفية وبيانات هطول الأمطار ومحددات جودة المياه. • **تطبيق النماذج الهيدرولوجية:** القدرة على استخدام النماذجالهيدرولوجية لمحاكاة العمليات الهيدرولوجية والتنبؤ بها. يجب أن يتعلموا اختيار النماذج المناسبة وتطبيقها لمختلف الظواهر الهيدرولوجية ، وتفسير مخرجات النموذج ، وتقييم دقتها وقيودها. • **تقييم موارد المياه:** تقييم موارد المياه في منطقة معينة ، مع الأخذ في الاعتبار عوامل مثل توفر المياه والطلب على المياه وجودة المياه . يجب أن يتعلموا تقييم آثار الأنشطة البشرية وتغير المناخ على موارد المياه وتطوير استراتيجيات لإدارة المياه المستدامة. • **تحليل وإدارة الفيضانات والجفاف:** يجب على الطلاب فهم أسباب وتأثيرات وإدارة الفيضانات والجفاف . يجب أن يتعلموا تحليل مخاطر الفيضانات والجفاف ، وتطوير استراتيجيات إدارة السهول الفيضانية ، واقتراح تدابير للتأهب للجفاف والتخفيف. • **فهم جودة المياه وتلوثها :** يجب على الطلاب اكتساب معرفة معلمات جودة المياه ، بما في ذلك الخصائص الفيزيائية والكيميائية والبيولوجية . يجب أن يفهموا مصادر وتأثيرات تلوث المياه ، وتقييم بيانات جودة المياه ، واقتراح استراتيجيات لتحسين جودة المياه والوقاية من التلوث. • **توصيل المعلومات الهيدرولوجية وتقديمها:** يجب على الطلاب تطوير مهارات اتصال فعالة لنقل المفاهيم الهيدرولوجية والبيانات والنتائج إلى جماهير مختلفة . يجب أن يكونوا قادرين على تقديم المعلومات الفنية بوضوح ، وكتابة التقارير ، والمشاركة في المناقشات العلمية.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. إظهار فهم شامل لدورة المياه ومكوناتها. 2. تطوير مهارات التحليل والتفكير النقدي. 3. دراسة تأثيرات الماء على البيئة والصحة. 4. التوعية بأهمية المحافظة على المياه. 5. جمع وتحليل وتفسير البيانات الهيدرولوجية بدقة وفعالية. 6. تطبيق النماذج الهيدرولوجية لمحاكاة العمليات الهيدرولوجية والتنبؤ بها. 7. تقييم وإدارة الموارد المائية ، مع الأخذ في الاعتبار الاستدامة والعوامل البيئية. 8. تقييم وإدارة مخاطر الفيضانات والجفاف ، وتطوير استراتيجيات التخفيف المناسبة. 9. فهم معلمات جودة المياه واقتراح تدابير لتحسين جودة المياه. 10. توصيل المفاهيم والنتائج الهيدرولوجية إلى الجماهير الفنية وغير الفنية. 11. العمل بشكل تعاوني في فرق متعددة التخصصات لمعالجة التحديات الهيدرولوجية.
	يتضمن المحتوى الإرشادي ما يلي. • **المياه السطحية:** 1. **مقدمة في الهيدرولوجيا:** • تعريف الهيدرولوجيا ونطاقها • أهمية الهيدرولوجيا في إدارة موارد المياه • التطور التاريخي للهيدرولوجيا 2. **دورة المياه:**

Indicative Contents المحتويات الإرشادية	• نظرة عامة على مكونات دورة الماء (هطول الأمطار ، التبخر ، النتح ، التوشيح ، الجريان السطحي) • العمليات والعوامل التي تؤثر على كل مكون • القياس الكمي لمكونات دورة المياه 3. **الساقط المطري:** • أنواع هطول الأمطار (هطول الأمطار ، تساقط الثلوج ، البرد ، إلخ) • قياس وتسجيل هطول الأمطار • تحليل وتفسير بيانات هطول الأمطار • التباين المكاني والزماني لهطول الأمطار 4. **التبخر والتبخر-النتح:** • التبخر وعوامله (درجة الحرارة ، الرياح ، الرطوبة ، إلخ) • تقنيات قياس التبخر • عمليات التبخر-النتح وأساليب التقدير (التبخر-النتح المحتمل والفعلي) 5. **التوشيح ومياه التربة:** • عمليات التوشيح والعوامل التي تؤثر على معدلات الأرتشاح • قياس وتقدير التوشيح • حركة وخزين مياه التربة • تقنيات قياس رطوبة التربة 6. **الجريان السطحي و جريان الجداول :** (8 ساعات) • عمليات توليد الجريان السطحي (فائض التوشيح ، فائض التشبع) • طرق تقدير الجريان السطحي (وحدة هيدروغرافيا ، الطريقة العقلانية ، إلخ) • تقنيات قياس تدفق التدفق (قياس الدفق ، هياكل قياس التدفق) • تحليل بيانات التدفق 7. **التحليل الهيدرولوجي:** (4ساعات) • تقنيات جمع البيانات الهيدرولوجية وتحليلها • التحليل الإحصائي للبيانات الهيدرولوجية 8. **تحليل الفيضانات وتكرارها:** (6 ساعات) • خصائص الفيضانات والأسباب • طرق تحليل تردد الفيضان (توزيعها المحتمل ، كميات الفيضان) • تقدير الفيضان وتحديد نمط الفيضان 9. **التطبيقات الهيدرولوجية:** (6 ساعات) • إدارة موارد المياه والتخطيط • الجوانب الهيدرولوجية لتقييمات التأثير البيئي • المخاطر المتعلقة بالماء (الجفاف والفيضانات وما إلى ذلك) وتقييم مخاطر تغير المناخ وآثاره على الهيدرولوجيا

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	

1. **التعليم القائم على المحاضرة :** ابدأ بالمحاضرات التقليدية لإدخال المفاهيم والنظريات والمبادئ الأساسية للهيدرولوجيا. استخدم الوسائل البصرية مثل الشرائح والرسوم البيانية والمخططات لتعزيز الفهم. 2. **دراسات الحالة :** إشراك الطلاب مع دراسات الحالة في العالم الحقيقي التي توضح تطبيق المبادئ الهيدرولوجية. يمكن تحليل البيانات الهيدرولوجية الفعلية ومناقشة التحديات والحلول التي تواجه سيناريوهات مختلفة تعميق فهم الطلاب للموضوع. 3. **الرحلات الميدانية والتجارب العملية : ترتيب**: الرحلات الميدانية إلى المسطحات المائية أو المرافق الهيدرولوجية أو مراكز الأبحاث لتزويد الطلاب بالتعرض العملي للعمليات الهيدرولوجية . إجراء تجارب عملية ، مثل قياس تدفق البث أو المياه الجوفية ، لمساعدة الطلاب على تطبيق المعرفة النظرية بطريقة ملموسة. 4. **تمارين حل المشكلات :** تصميم تمارين حل المشكلات التي تتطلب من الطلاب تحليل وحل المشكلات الهيدرولوجية. يمكن أن يشمل ذلك حساب توازن المياه ، أو تحليل أنماط هطول الأمطار ، أو التنبؤ بمخاطر الفيضان. شجع مناقشات المجموعة وتعلم الأقران لتعزيز مهارات حل المشكلات التعاونية. 5. **نمذجة الكمبيوتر والمحاكاة :** استخدم برامج النمذجة الهيدرولوجية والمحاكاة لإظهار العمليات الهيدرولوجية المعقدة. يمكن أن تساعد هذه الأدوات الطلاب على فهم مفاهيم مثل نمذجة هطول الأمطار والتنبؤ بالفيضانات وتدفق المياه الجوفية. 6. **محاضرات الضيوف ومحادثات الخبراء :** دعوة المتحدثين بالضيوف ، مثل علماء الهيدرولوجيا ، أو مهندسي موارد المياه ، أو الباحثين ، لتبادل تجاربهم ورؤيتهم . يمكن أن توفر هذه الجلسات للطلاب منظوراً أوسع حول التطبيقات العملية للهيدرولوجيا وإلهامهم للمهن المستقبلية. 7. **مناقشات تفاعلية :** تسهيل مناقشات الطبقة التفاعلية حول القضايا الهيدرولوجية الحالية والتحديات والمناقشات. شجع الطلاب على تحليل وجهات النظر المختلفة بشكل نقدي واقتراح حلول مبتكرة . يعزز هذا النهج التفكير النقدي ويعزز قدرة الطلاب على تطبيق المبادئ الهيدرولوجية في سياقات العالم الحقيقي. 8. **موارد الوسائط المتعددة:** دمج موارد الوسائط المتعددة مثل مقاطع الفيديو أو الأفلام الوثائقية أو البرامج التعليمية عبر الإنترنت لتكملة تعليمات الفصول الدراسية . يمكن أن توضح هذه الموارد بصريًا العمليات الهيدرولوجية ، وعرض التقنيات المبتكرة ، وإظهار الأحداث الهيدرولوجية في العالم الحقيقي. 9. **التقييمات والتعليقات:** تنفيذ مجموعة متنوعة من أساليب التقييم ، بما في ذلك الاختبارات والواجبات والعروض التقديمية والمشاريع ، لتقييم فهم الطلاب وتطبيق المفاهيم الهيدرولوجية . تقديم ملاحظات في الوقت المناسب لمساعدة الطلاب على تحديد مجالات لتحسين وتشجيع مشاركتهم النشطة في عملية التعلم. 10. **التعلم التعاوني:** تعزيز التعلم التعاوني من خلال مشاريع المجموعة أو الأنشطة التي تتطلب من الطلاب العمل معًا لحل المشكلات الهيدرولوجية أو إجراء البحوث . يعزز هذا النهج العمل الجماعي ، ومهارات الاتصال ، وفهم أعمق للموضوع من خلال الجهد الجماعي.	

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	6, 13	LO #1, 2, 10 and 11
	Assignments	2	5% (5)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	20% (20)	Continuous	All
	Report	1	5% (5)	14	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	مقدمة في الهيدرولوجيا، الدورة الهيدرولوجية والموازنة المائية
Week 2	الساقط المطري وأنواع الساقط المطري وقياس وتسجيل الأمطار
Week 3	تحليل وتفسير بيانات الأمطار ، التباين المكاني والزماني للساقط المطري، تمهيد عن التبخر _النتح
Week 4	التبخر وعوامله ، تقنيات قياس التبخر ، عمليات التبخر وطرق التقدير.
Week 5	النتشيح وعمليات الأرتشاح والعوامل التي تؤثر على معدلات النتشيح وقياس وتقدير النتشيح.
Week 6	المياه المخزونة في التربة وحركتها ، تقنيات قياس رطوبة التربة، الجريان السطحي
Week 7	امتحان نصف الكورس, العوامل المؤثرة على الجريان السطحي ، وطرق تقدير الجريان السطحي، تحليل الفيضانات وتكرارها
Week 8	خصائص الفيضانات والأسباب، طرق تحليل تردد الفيضان (توزيعها المحتمل ، كميات الفيضان)، تقدير الفيضان وتحديد نمط الفيضان
Week 9	تقنيات قياس التدفقات النهرية ، تحليل بيانات تدفقات الجداول
Week 10	التحليل الهيدرولوجي ، جمع البيانات الهيدرولوجية ، تقنيات التحليل الإحصائي للبيانات الهيدرولوجية
Week 11	.الأنهار والجداول: دراسة تكوين الأنهار والجداول، توزيعها، حركتها، وأهميتها كمصدر للمياه.
Week 12	إدارة الموارد السطحية: استراتيجيات إدارة الموارد المائية السطحية، الحفاظ عليها، واستخدامها المستدام.
Week 13	الفيضانات والجفاف: دراسة أسباب وآثار الفيضانات والجفاف، وإدارة المخاطر المرتبطة بها
Week 14	إدارة الأحواض المائية: استراتيجيات إدارة الأحواض المائية، والتخطيط المستدام لاستخدام المياه السطحية.
Week 15	الجوانب الهيدرولوجية لتقييم الأثر البيئي والمخاطر المتعلقة بالمياه، التغيرات المناخية واثارها على الهيدرولوجي.
Week 16	الامتحان النهائي.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	1.عناصر الدورة الهيدرولوجية وتحويل الوحدات الهيدرولوجية.
Week 2	2.الموازنة المائية، طرق حساب الموازنة المائية
Week 3	3.السقيط: انواعه وطرق القياس وكفاية المحطات وحساب المعلومات المفقودة
Week 4	4.فحص تجانس السجلات المطرية وطرق عرض البيانات المطرية
Week 5	5.حساب معدل السقيط فوق مساحة + تردد سقوط المطر
Week 6	6.التبخر: مقاييس التبخر+ معادلات التبخر التجريبية
Week 7	7.معادلات التبخر الكلية + حساب معدل التبخر عمليا
Week 8	8.الارتشاح: سعة الارتشاح+قياس الرشح عمليا+قيم سعة الارتشاح
Week 9	9.امثلة على معادلة هورتون للارتشاح، ادلة الارتشاح
Week 10	10.طرق حساب التصريف النهري
Week 11	11.الهيدروغراف وطرق فصل الهيدروغراف
Week 12	12. الخصائص المورفومترية للاحواض المائية
Week 13	13. تحليل الفيضانات
Week 14	14. دراسة حالات الجفاف
Week 15	15. مشاريع بحثية وتطبيقات عملية

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	مبادئ الهيدرولوجي ، (نظير الانصاري، 1979) علم المياه وتطبيقاته، (باقر احمد، 1982) هيدرولوجية المياه الجوفية، (ديفيد توود 1959)، ترجمة رياض حامد الدباغ، وحميد رشيد رفيق "Applied Hydrology" by Ven Te Chow, David R. Maidment, and Larry W. Mays (1988).	Yes

	"Introduction to Hydrology" by Warren Viessman Jr., Gary L. Lewis, and John W. Knapp (2013) "Groundwater Hydrology" by M.A. Todd and L.W. Mays (2004)	
Recommended Texts		No
Websites	• United States Geological Survey (USGS) Water Science School: The USGS Water Science School website offers a wide range of educational resources and information on hydrology, including articles, videos, interactive activities, and data. Visit their website at: https://www.usgs.gov/water-science-school • Hydrologic Engineering Center (HEC): HEC, a part of the US Army Corps of Engineers, provides various resources and software tools for hydrologic engineering and water resources planning. Their website offers technical documentation, publications, and software downloads. Access their website at: https://www.hec.usace.army.mil/ • National Weather Service (NWS): The NWS website provides educational materials and resources on weather and hydrology. They offer information on rainfall, river stages, flood forecasting, and more. Visit their website at: https://www.weather.gov/ • Hydrology Online: Hydrology Online is an educational platform that offers online courses, tutorials, and resources on various aspects of hydrology, including rainfall-runoff modeling, flood forecasting, and watershed management. Explore their website at: https://www.hydrologyonline.com/ • Hydrology.org: Hydrology.org is an online portal dedicated to hydrology and water resources. It provides access to articles, publications, research papers, and information on conferences and events related to hydrology. Visit their website at: http://www.hydrology.org/	

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria

Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Computer science**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	UOM13211				
ECTS Credits	**3**				
SWL (hr/sem)	**75**				
Module Level	2		**Semester of Delivery**	2	
Administering Department	Environmental Technology		**College**	environmental science and technology	
Module Leader	Muthaina . A. Mustafa		**e-mail**	buthaina@uomosul.edu.iq	
Module Leader's Acad. Title	teacher		**Module Leader's Qualification**	M.S.C.	
Module Tutor	Raghad H.Saeed		**e-mail**	Raghad.h.alshekh@uomosul.edu.iq	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	21/06/2023		**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 Aims أهداف المادة الدراسية	**1- Promote the student's knowledge of computers, its various applications, and its programs, which are used in a variety of fields and the latest technological developments.** **2- This course deals with the basics of computers, basic programs in it, viruses and how to eliminate them.** **3- How to prepare and operate office programs and services packages and how to use email and the Internet.** **4- Promotion of self-education, which enables the teacher to calculate individual differences and eventually improves the quality of learning and teaching, is one of the goals of using technology in the semester and the ability to achieve educational goals that involve skills, such as learning, computer and problem solving.** **5- Students are attracted to it because it is an interesting topic. Because it is a fun way to break the student's monotonous memorization and work routine.** **6- He frees the teacher from spending time and effort in routine educational tasks, which allows him to allocate more time and energy to design learning situations and experiences that support the intellectual and social growth of students 'personalities. Establishing easy -to -adapt programs for students' needs, displaying the scientific subject and identifying students 'weaknesses**
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**1- The student will get to know the Internet, their types, and ways to discover and repair breakdowns.** **2- The student will learn about the nature and concepts of e-commerce.** **3- The student will learn how to discover and fix computer errors. The student will learn about artificial intelligence and its uses in our daily life and current and future applications of artificial intelligence.** **4- The student will learn how to discover and fix computer errors.** **5- The student will learn about artificial intelligence and its uses in our daily life, the current applications of artificial intelligence, the importance of artificial intelligence in society and future aspirations to use artificial intelligence techniques**
Indicative Contents المحتويات الإرشادية	**:The guiding content includes the following** **Networks and their types; Network components. Network security basics. Understanding network threats. Explore and repair network errors. (4 hours)**

	Electronic banking services concepts. (4 hours) **Determine and solve the common devices and software problems faced by computer users. (8 hours)** **Artificial intelligence, artificial intelligence history, artificial intelligence techniques and methods, and ethical challenges and considerations. (8 hours)** **Artificial intelligence in smartphones and virtual assistants such as Siri or Google .Assistant** **Education, health care, financial, transportation, marketing and advertising. (8 hours)** **(12) .Education, health care, financial, transportation, marketing and advertising** **How artificial intelligence affects social relations, artificial intelligence, international relations, artificial intelligence and the future of humanity. (4 hours)** **Artificial intelligence, privacy and monitoring ethics, and the impact of artificial .intelligence on the labor market** **Future trends in artificial intelligence, modern research and emerging techniques. (4 hours)**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**The development of the computer and the Internet has had a significant impact on educational systems around the world because they are practical tools that can be used to enhance the educational process by continuously diversifying information and its modernity, diversifying the possibilities, developing communication skills in teams, fostering a climate of freedom in the classroom, and utilizing open education in universities. the ability to obtain current research from universities and research centers, the use of the Internet to publicize conferences and educational activities.**

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	45	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	30	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

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

Total assessment	100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	المفردات المعطاة
Week 1	**Security and networking: what is a network? Types of networks. Basic network components**
Week 2	**Security and networking (Cont.): Network security Basics. Understanding network threats**
Week 3	**E-commerce: concepts of electronic banking services this include online banking: ATM and debit Card services, phone banking, SMS banking, electronic alert, Mobile banking**
Week 4	**Computer Troubleshooting: Identifying and solving common hardware and software problems that computer users encounter.**
Week 5	**Computer Troubleshooting (Cont.): Basic troubleshooting techniques and tools for diagnosing and resolving issues.**
Week 6	**Introduction to AI: Definition of AI, History of AI, AI Techniques and approaches.**
Week 7	**Introduction to AI (Cont.) : Key characteristics of AI , Benefits of AI, Challenges and Ethical considerations.**
Week 8	**The Role of AI in Modern smartphones: AI-Driven Mobile Technologies, Virtual Assistants (Siri , Google Assistant, Alexa).**
Week 9	**The Role of AI in Modern Smartphones (cont.) : Adaptive Learning , Real-Time Translation Services**
Week 10	**Applications and Tools of AI : Overview of AI Application in Various Industries, Education and Healthcare .**
Week 11	**Applications and Tools of AI (Cont.) : Transportation, Marketing and Advertising .**
Week 12	**Applications and Tools of AI (Cont.) : Finance Robotics and Automation Technologies .**

Week 13	**AI and Society: How AI affects social, AI and Intemational relations, AI and future of humanity.**
Week 14	**Ethical Challenges in AI : AI ethics , privacy and surveillance, the impact of AI on the job market.**
Week 15	**The Future of AI : Future trends in AI, recent research and emerging technologies.**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	**Using the Open Scholar platform in open access to scientific research, academic data, repositories and other research sources using artificial intelligence techniques using the link** **https:// openscholar.allen.ai**
Week 2	**Chat class apps and generative artificial intelligence for scientific texts and paraphrasing: Led by ChatGPT for free from Microsoft office**
Week 3	**Apply image analysis from, translate and extract texts without having to leave the window using the linkhttps//gemini. Google.com/app**
Week 4	**Question.AI used to solve mathematical equations and contains calculator and other tools**
Week 5	**Photo and video processing applications: Occupy this list Midjourney**
Week 6	**AI typing: Quill Bot chat came Data processing applications**
Week 7	**Data processing apps: including Hugging Face**
Week 8	**Gamma Ei does professional presentation**
Week 9	**Magic school**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**لا يوجد**	Yes
Recommended Texts	**1. Graham Brown, David Watson, "Cambridge IGCSE Information and Communication Technology", 3rd Edition (2020)** **2. Alan Evans, Kendall Martin, Mary Anne Poatsy, "Technology In Action Complete", 16th Edition (2020).** **3. Ahmed Banafa, "Introduction to Artificial Intelligence (AI)", 1st Edition (2024).** **1 - الخضر علي الخضر بحاث " أساسيات الحاسوب" 2016 4** **الدكتور عادل عبد النور, مدخل إلى عالم الذكاء الاصطناعي " 2005 5**	**No**
Websites	**https://www.microsoft.com/ar/microsoft-365/powerpoint?market=er1** **https://www.xda-developers.com/conditional-formatting-automate-excel-spreadsheet/**	

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	**Engineering Analysis**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code					
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	2		**Semester of Delivery**	2	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Dr. Tahseen Ali Gelmiran		**e-mail**	tahssenali1967@uomosul.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	05/01/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Math. ! , Math. 2	**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To develop the skills of solving mathematical equations through the application of techniques. 2. Learn how to form differential equations. 3. Finding the degree and order of differential equations. 4. Methods of solving first-degree and first-order differential equations. 5. Applications of first-degree and first-order differential equations. 6. Methods for solving second degree differential equations. 7. Applications of second-degree differential equations
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Learn how to form a differential equation. 2. Learn about differential equation solving methods. 3. Using multiple methods to solve the differential equation according to its properties. 4. Description of ways to find equations and functions through practical data. 5. Description of ways to find missing values from practical data without the existence of an equation or function. 6. Discuss ways to obtain derivative values through practical data.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Learn the concept of differential equations, methods of forming differential equations, methods of solving first-order and first-order differential equations, and methods of solving first-order differential equations with applied examples. [35 hours] Learn how to solve second-order differential equations according to the type of function using multiple methods and techniques with practical examples. [40 hours] Solving simultaneous differential equations with applied examples. [10 hours] Revision problem classes [5 hours]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in presenting this unit is to encourage students to participate and interact with the material through the course, while improving, expanding and nurturing thinking skills, and training students in scientific and logical thinking methods. And this will be achieved through the scientific material of the course and interactive educational programs and through the development of logical methods for scientific thinking to solve mathematical equations.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	90	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	35	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
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**	3	15% (10)	2, 5, 12	LO #1, 2-3 and 5-7
	Assignments	2	15% (10)	2, 4, 11, 12	LO # 1, 3, 5 and 7
	Projects / Lab.				
	Report	1	10% (10)	13	LO # 3, 5 and 8
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-4
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Order and degree of differential equations
Week 2	formation of differential equations
Week 3	Solution of differential equations of first order and first degree, Separation of variable method
Week 4	Homogeneous method
Week 5	Linear differential equations method
Week 6	Exact differential equations method
Week 7	Applications of first-degree and first-order differential equations
Week 8	Mid-term Exam
Week 9	Linear differential equations of second order, method for finding the complementary function
Week 10	Rules to find integral 1
Week 11	Rules to find integral 2
Week 12	The Homogeneous Linear Equations
Week 13	Method of Variation of Parameters
Week 14	Simultaneous Differential Equations
Week 15	Applications of second-degree differential equations
Week 16	**Final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Engineering Mathematics H. K. Dass	Yes
Recommended Texts	Numerical Methods P. Kandasamy and K. Thilagavathy	No
Websites		

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Environmental Chemistry 2**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code					
ECTS Credits	**7**				
SWL (hr/sem)	**175**				
Module Level		2 (Undergraduate	**Semester of Delivery**		2
Administering Department		Department of Environmental Technologies	**College**	College of Environmental Science	
Module Leader	Assist.Prof.Dr.Eman A.M. Al-jawadi		**e-mail**	emanaljawadi@uomosul.edu.iq	
Module Leader's Acad. Title		Assist.Prof.	**Module Leader's Qualification**		Ph.D./Chemistry Science
Module Tutor	Dr. Abdul SattarJubairZaben **Practical lab lecturer's:** Mustafa AmerDhannoon Mohammed SaadallahYounus AbeerSalh		e-mail	Sattarjubair @uomosul.edu.iq	
Peer Reviewer Name		ا.م.د.يسرى الشاكر	**e-mail**	E-mail	
Scientific Committee Approval Date		2024	**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Chemistry 1+Chemistry 2+ Environmental Chemistry1	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The main aim of the course is to equip students with the knowledge of the chemical properties of elements and compounds, as well as about the chemical reactions essential for the emergence and existence of the cycling and accumulation of pollutants in the environment. The course addresses the chemistry of elements and compounds in the atmosphere, water and soil, and lays special emphasis on the processes that define the connections and the dependence between individual segments of environment. This knowledge is essential for the understanding of environmental phenomena, as well as for more specialised studies.
Module Learning Outcomes	Knowledge and understanding: Ability of describing the basic concepts and laws of chemistry both in theory and practice Ability to learn how to analyze and interpret information, and apply it in interdisciplinary and other discipline fields Students learn the basic principles of environmental chemistry (Content Solid-state and Liquid state environmental chemistry, Gaseous-state environmental chemistry, Applied environmental chemistry) . They will be able to apply previous knowledge on analytical chemistry to environmental processes and samples. They will understand the interconnections between different sectors of the environment (soil, water, atmosphere) and the effect of human activities on the natural chemical processes.
مخرجات التعلم للمادة الدراسية	Upon successful completion of this course, students will be able to:

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The course Environmental chemistry provides students with basic knowledge useful in other courses, such as in the courses covering topics of atmospheric, water and soil pollution, the course Waste treatment and management, and others.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	108	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	14

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	67	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	14
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)	4,7,9,12,15	LO #1 -3,4-6,7-8,19-12and 13-14
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Tutorial	2	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	3hr	10% (10)	10	LO # 1-8
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Air Pollution**
Week 2	**Human effect of Air Pollution & it effect on environement**
Week 3	**Global Warming, Greenhouse Effect, Thinning of the Ozone Layer**
Week 4	**Photochemical Smog, Acid Rains**

Week 5	**Radiation pollution**
Week 6	**Water pollution..1**
Week 7	**Water pollution…2** **Human effect on Water pollution**
Week 8	**Soil pollution…1**
Week 9	**Soil pollution…2**
Week 10	**Heavy metals pollution**
Week 11	**Midterm exam**
Week 12	**Oil pollution…1**
Week 13	**Oil pollution…2**
Week 14	**Pollution study case examples..1**
Week 15	**Pollution study case examples..2**
Week 16	**Final exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	**Dissolved oxygen in water**
Week 2	**Biological oxygen demand (1)**
Week 3	**Biological oxygen demand (2)**
Week 4	**Chemical oxygen demand (1)**
Week 5	**Chemical oxygen demand (2)**
Week 6	**Calcium ion in water**
Week 7	**Fluoride in water**
Week 8	**Measuring carbonates in water**
Week 9	**Measurement of bicarbonate in water**
Week 10	**Phosphate ion in water**
Week 11	**Nitrate ion in water**

Week 12	**Determination of lead in water**
Week 13	**Determination of cadmium in water**
Week 14	**Determination of zinc in water**
Week 15	**Methods of analyzing results and comparing them with global and local determinants**
Week 16	**Final exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	• C. Baird, Environmental Chemistry, W. H. Freeman and Company, 1998. **Catalogue** **E-version** • D. W. Hawker, D. W. Conell, M. Warne, P. D. Vowles: Basic Concepts of Environmental Chemistry, Lewis Publishers, Inc., 1997. **E-version**	
Recommended Texts	• R. P. Schwarzenbach, P. M. Gschwend, D. M. Imboden: Environmental Organic Chemistry, J. Wiley and Sons, Inc. 1998. **Catalogue** **E-version** • G. Howard: Aquatic Environmental Chemistry, Oxford Science Publ., 1998. **Catalogue** **E-version** • S. E. Manahan: Environmental Chemistry, Lewis Publishers, Inc., 1994. **E-version**	
Websites		

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

(50 - 100)	**B -** Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (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	**Environmental geology**			**Module Delivery**	
Module Type				☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code					
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	2		**Semester of Delivery**	2	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Dr. Hazim Jumaa Mahmood		**e-mail**	hazimjm@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Providing students with information and understanding about the most important surface and interior geological processes, along with their environmental consequences, as well as experience with topographical and geological maps. 2. Understanding the fundamental principles of geochemical exploration and the background concentrations of chemical elements, and applying this knowledge to the investigation of natural and anthropogenic causes of pollution. 3. Understanding the nature of basic geological processes and their relationship to natural hazards, as well as determining the areas most vulnerable to geological hazards and their impact on human life.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Describe the fundamental Concepts of Environmental Geology 2. The ability to apply basic geochemical exploration concepts to environmental concerns. 3. Identify the types of plate boundaries and their relationship to crustal 4. Describe the interactions between tectonic plates and volcanic eruptions and earthquakes. 5. Understand environmental problems derived from aspects of geological processes. 6. Describe the main causes of environmental and geological natural disasters such as earthquakes, volcanoes, landslides and subsidence. 7. Determine the area most likely to be exposed to natural hazards. 8. construct and interpret geologic and topographic maps, cross-sections, and topographic profiles
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Introduction to Environmental Geology, Fundamental Concepts of Environmental Geology. [3hrs] Part A - geological environments andexploration Geochemical environments. [5 hrs] Geochemical exploration, basic understanding,methods of geochemical survey.[13hrs] Geochemical Anomalies and Mineral Deposits. [3hrs] Part B -Plate tectonics,Earth Processes and Natura l Hazards Plate tectonics. [5 hrs] Internal Earth Processes and Natura l Hazards. [12hrs] Surface Earth Processes and Natura l Hazards. [9hrs] Mineral and Rock Resources. [3hrs] Construct and interpret geologic and topographic maps, cross-sections, and

	topographic profiles. [14hrs] Natural hazard risk assessments. [3hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	This course will be delivered through a combination of lectures, discussions, exercises, and lab. The key strategy for presenting this subject will be to stimulate student participation while also polishing and strengthening their critical thinking skills. Student learning will be assessed through graded laboratory tests and examinations covering lecture content and through practical quizzes on lab exercises.

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Environmental Geology
Week 2	geochemical environments
Week 3	geochemical exploration, basic understanding
Week 4	Methods of geochemical survey
Week 5	Geochemical Anomalies and Mineral Deposits
Week 6	Plate Tectonics
Week 7	Mid-term Exam
Week 8	Earth Processes and Natura l Hazards
Week 9	Earthquakes and Related Phenomena
Week 10	World Distribution of Earthquakes and seismic belts
Week 11	Volcanic Activity
Week 12	Mass Movements
Week 13	Streams and Flooding
Week 14	Drought and desertification
Week 15	Mineral and Rock Resources
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Types of maps and map scale
Week 2	Lab 2: Topographic maps 1
Week 3	Lab 3: Topographic profile
Week 4	Lab 4: Geological maps and Cross-sections
Week 5	Lab 5: : Geological maps (horizontal strata)
Week 6	Lab 6: : Geological maps(verticalstrata)
Week 7	Lab 7: Geological maps(Inclined strata)

Week 8	Lab 8: Natural hazard risk assessments

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Environmental geology, (2020), Carla W. Montgomery.— 11th ed.	
Recommended Texts	Environmental geology, (2016), ghazi et al.	
Websites		

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Fluid 2			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code					
ECTS Credits					
SWL (hr/sem)	**125**				
Module Level	2		**Semester of Delivery**	2	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Dr. Tahseen Ali Gelmirn		**e-mail**	tahssenali1967@uomousl.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date			**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 Aims أهداف المادة الدراسية	1. Learn how to calculate the discharge in pipes and methods of analysis. 2. Design of parallel pipe networks. 3. Design of series pipe networks. 4. Design of compounds pipe networks. 5. Identify the types of open channels. 6. Identify open channel design methods.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Learn about methods of measuring and calculating losses in pipes. 2. Learn about the methods of designing pipeline networks. 3. Identify methods for calculating losses in pipes. 4. Identify the types of open channels and how to design them.
Indicative Contents المحتويات الإرشادية	Identify the characteristics of fluid flow in pipes using different connection methods, calculate the discharge in these pipes, the speed of fluid flow in them, and how to calculate the appropriate diameters for transporting these fluids. [25 hrs] Learn about several methods for calculating losses in pipes according to the method of connecting them and calculating the pressure and speed of fluid flow in the pipes.[24hrs] Learn about the types of open channels and how to design them.[15hrs] Identifying the devices for calculating losses in pipes practically in the laboratory and the laws and equations used in calculating them, using the devices and special methods for measuring discharge in the laboratory and identifying the laws and equations for calculating it theoretically. [20hrs] Revision problem classes [6 hrs]
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in presenting this unit is to encourage students to participate and interact with the material throughout the course, while improving, expanding and nurturing their thinking skills, and training students on scientific and logical thinking methods and learning about the concept of fluids. This will be achieved through the scientific material of the course, interactive educational programs and their practical and laboratory applications, and by developing logical methods for scientific thinking and linking the scientific material and applying it in practical life. This is done by learning about the physical properties of fluids, learning about pressure measuring devices practically, learning to calculate pressure theoretically through mathematical theories and equations, learning about methods of analyzing pressure and velocity, calculating discharge in pipes, determining their diameters, how to connect them, and calculating the losses that occur during them practically in the laboratory and theoretically through their laws and theories. As well

	as learning about the types of open channels and the design equations for open channels.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	65	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	60	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
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	15% (10)	3, 5 and 13	LO #1-2, 3-5 and 7-9
	Assignments	2	15% (10)	2, 5, 10 and 14	LO # 1-2, 3-5, 6-7 and 8-9
	Projects / Lab.				
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-6
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Flow Through Simple Pipes
Week 2	Loss of Head in Pipes, Darcy Formula
Week 3	Chezy Formula
Week 4	Hydraulic Gradient Line and Total Energy Line
Week 5	Minor Energy Losses
Week 6	Pipes in Parallel
Week 7	Pipes in Series
Week 8	**Mid-term Exam**
Week 9	Compound Pipes
Week 10	Compound Pipes
Week 11	Open Channel
Week 12	Types of Channels
Week 13	Open Channel Formula
Week 14	Chezy formula
Week 15	Manning formula
Week 16	**Preparatory week before the finalExam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Discharge Measurement in Open Channel by Weirs
Week 2	Lab 1: Discharge Measurement in Open Channel by Weirs
Week 3	Lab 2: Friction Factor in Pipes
Week 4	Lab 2: Friction Factor in Pipes
Week 5	Lab 3: Discharge Measurements in Pipes by Venturi Meter
Week 6	Lab 3: Discharge Measurements in Pipes by Venturi Meter
Week 7	Lab 4: Discharge Measurements in Pipes by Orifice Meter
Week 8	Lab 4: Discharge Measurements in Pipes by Orifice Meter

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Fundamentals of Fluid Mechanics, Munson, Okiishi, Huebsch and Rothmayer تجارب في الهيدروليك ، مؤيد سعدالله	Yes
Recommended Texts	Fluid Mechanics, R. K. Rajput	
Websites		

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

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**علم المياه (2)**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	**UoB12345**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	1		**Semester of Delivery**	1	
Administering Department			**College**	Type College Code	
Module Leader	علي زين العابدين حيدر		**e-mail**	aalozeer@uomosul.edu.iq	
Module Leader's Acad. Title	مدرس		**Module Leader's Qualification**	دكتوراه	
Module Tutor	فرح خزعل سعيد		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	مادة علم الارض	**Semester**	1 or 2
Co-requisites module	علم المياه	**Semester**	2

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	• **فهم أنظمة المياه الجوفية:** تزويد الطلاب بفهم شامل لأنظمة المياه الجوفية، بما في ذلك وجودها وتوزيعها وحركتها. • **التفاعل بين المياه الجوفية والمياه السطحية** : استكشاف العلاقة بين المياه الجوفية والمياه السطحية، والعمليات التي تحكم هذا التفاعل. • **موارد المياه الجوفية وإدارتها** : دراسة أهمية المياه الجوفية كمورد مائي حيوي، بما في ذلك إدارتها المستدامة وحمايتها وترميمها. • **طرق الهيدروجيولوجيا** : تعريف الطلاب بالتقنيات المستخدمة في التحقيق والتقييم والنمذجة لأنظمة المياه الجوفية. • **تأثير الأنشطة البشرية:** مناقشة تأثير الأنشطة البشرية على جودة وكمية المياه الجوفية، والآثار المترتبة على أمن المياه والاستدامة البيئية. • **فهم تأثير التغيرات المناخية على المياه الجوفية** : معرفة العوامل المناخية الاكثر تأثيرا على المياه الجوفية .
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**•شرح أساسيات هيدرولوجيا المياه الجوفية:** • فهم مبادئ تدفق وتخزين المياه الجوفية في أنواع مختلفة من الأحواض المائية. • وصف الدورة الهيدرولوجية ودور المياه الجوفية فيها. **•تحليل أنظمة المياه الجوفية:** • تحديد وتصنيف أنواع مختلفة من الأحواض المائية والحواجز المائية. • تقييم العوامل التي تؤثر على إعادة شحن المياه الجوفية وتصريفها وتدفقها. **•تطبيق تقنيات الهيدروجيولوجيا:** • استخدام الأساليب الميدانية والمخبرية لقياس وتحليل خصائص المياه الجوفية. • تطبيق النماذج الرياضية لمحاكاة تدفق المياه الجوفية وعمليات النقل. **•تقييم جودة المياه الجوفية:** • فهم مصادر تلوث المياه الجوفية والعمليات التي تؤثر على جودة المياه الجوفية. • تقييم تأثير استخدام الأراضي والأنشطة الصناعية والممارسات الزراعية على جودة المياه الجوفية. **•اقتراح استراتيجيات مستدامة لإدارة المياه الجوفية:** • تطوير استراتيجيات لإدارة مستدامة لموارد المياه الجوفية، مع مراعاة الجوانب القانونية والاقتصادية والبيئية. • تقييم فعالية تقنيات ترميم المياه الجوفية الملوثة. **•تقييم السياسات واللوائح الخاصة بالمياه الجوفية بشكل نقدي:** • تحليل السياسات الوطنية والدولية المتعلقة بإدارة المياه الجوفية. • مناقشة التحديات التي تواجه تنفيذ ممارسات إدارة المياه الجوفية المستدامة في مختلف السياقات.

المحتوى الإرشادي 1. **مقدمة في هيدرولوجيا المياه الجوفية:** ○ مفاهيم أساسية عن المياه الجوفية، الأحواض المائية، والحواجز المائية. ○ الدورة الهيدرولوجية ودور المياه الجوفية فيها. 2. **مبادئ تدفق المياه الجوفية:** ○ قانون دارسي ومبادئ تدفق المياه الجوفية. ○ التوصيل الهيدروليكي، النفاذية، والسعة التخزينية. 3. **أنواع وخصائص الأحواض المائية:** ○ الأحواض المائية المحصورة، غير المحصورة، والمعلقة. ○ المسامية والنفاذية للتكوينات الجيولوجية المختلفة. 4. **إعادة شحن وتصريف المياه الجوفية:** ○ آليات إعادة الشحن الطبيعية والاصطناعية. ○ التفاعل بين المياه الجوفية والمياه السطحية وتدفق القاعدة. 5. **استكشاف ومراقبة المياه الجوفية:** ○ الطرق الجيوفيزيائية لاستكشاف المياه الجوفية. ○ تسجيل الآبار، قياسات الضغط الجوفي، وأخذ عينات المياه الجوفية. 6. **جودة المياه الجوفية والتلوث:** ○ مصادر وأنواع ملوثات المياه الجوفية. ○ العمليات التي تؤثر على نقل وانتشار الملوثات. 7. **نمذجة المياه الجوفية:** ○ مقدمة في نماذج تدفق المياه الجوفية) مثل.(MODFLOW ○ نمذجة نقل الملوثات. 8. **إدارة المياه الجوفية والاستدامة:** ○ حقوق المياه، التخصيص، والأطر التنظيمية. ○ دراسات حالة حول إدارة المياه الجوفية المستدامة. 9. **تأثير تغير المناخ على المياه الجوفية:** ○ تأثير تغير المناخ على إعادة شحن وتوافر المياه الجوفية. ○ استراتيجيات التكيف لإدارة المياه الجوفية في ظل تقلب المناخ. 10. **ترميم المياه الجوفية:** ○ الأساليب الفيزيائية والكيميائية والبيولوجية لترميم المياه الجوفية. ○ دراسات حالة عن مشاريع تنظيف المياه الجوفية الناجحة.	**Indicative Contents** المحتويات الإرشادية

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	• **شرح المفاهيم الأساسية:** تقديم المحاضرات التي تشرح المفاهيم الأساسية لهيدرولوجيا المياه الجوفية، مثل تدفق المياه الجوفية، أنواع الأحواض المائية، وعمليات إعادة الشحن والتصريف. • **دمج الأنشطة التفاعلية:** استخدام الأسئلة التفاعلية، العروض التوضيحية، والمناقشات الجماعية لتعزيز التفاعل مع المادة وتوضيح المفاهيم.

الدروس العملية: • **التدريب الميداني:**تنظيم زيارات ميدانية إلى مواقع ذات أهمية هيدرولوجية مثل الآبار، العيون، والمناطق الجيولوجية لدراسة الأحواض المائية. هذا يساعد الطلاب على تطبيق ما تعلموه نظريًا في بيئة واقعية. • **العمل المخبري:**تنفيذ تجارب مخبرية لقياس خصائص المياه الجوفية، مثل النفاذية، المسامية، وتركيب الماء الكيميائي. يساهم ذلك في تعزيز المهارات التحليلية والفنية لدى الطلاب. **التعلم القائم على المشاريع:** • **مشاريع جماعية:**تقسيم الطلاب إلى مجموعات لتنفيذ مشاريع متعلقة بإدارة المياه الجوفية، مثل تقييم جودة المياه الجوفية في منطقة معينة أو تطوير استراتيجية إدارة مستدامة للمياه الجوفية. هذه المشاريع تشجع التعاون، التفكير النقدي، وتطبيق المعرفة. • **دراسات حالة:**دراسة وتحليل حالات واقعية لإدارة المياه الجوفية، مما يتيح للطلاب فهم التحديات والحلول المحتملة في سياقات مختلفة. **استخدام البرمجيات والمحاكاة:** • **النمذجة الحاسوبية:**تدريب الطلاب على استخدام برامج نمذجة المياه الجوفية مثل MODFLOW لمحاكاة تدفق المياه الجوفية ونقل الملوثات. هذه المهارة مفيدة في تحليل البيانات واتخاذ القرارات المدروسة. • **محاكاة الأنظمة البيئية:**استخدام أدوات المحاكاة لفهم التفاعلات المعقدة بين المياه الجوفية والمياه السطحية والعوامل البيئية الأخرى. **التعلم القائم على حل المشكلات:** • **مشكلات مفتوحة النهاية:**تقديم مشكلات أو سيناريوهات واقعية تتعلق بإدارة المياه الجوفية، وتكليف الطلاب بحلها باستخدام المعرفة المكتسبة. هذا النوع من التعلم يشجع الابتكار والتفكير النقدي. • **مناقشات القضايا المعاصرة:**تنظيم مناقشات حول القضايا الحالية المتعلقة بالمياه الجوفية، مثل تأثير تغير المناخ على الموارد المائية أو تحديات تلوث المياه الجوفية. **التقييم التكويني والمستمر:** • **اختبارات قصيرة وأسئلة نقاشية:**إجراء اختبارات قصيرة بشكل دوري وأسئلة نقاشية خلال المحاضرات لتقييم فهم الطلاب وتحديد المفاهيم التي تحتاج إلى مزيد من التركيز. • **تغذية راجعة منتظمة:**تقديم تغذية راجعة منتظمة وشخصية للطلاب حول تقدمهم في المشاريع والتقارير المخبرية، مما يساعدهم على تحسين مهاراتهم وفهمهم. **المصادر التعليمية المتنوعة:** • **القراءات الموصى بها:**توجيه الطلاب إلى قراءة مقالات علمية، كتب مرجعية، وتقارير منظمات دولية لتوسيع معرفتهم وفهمهم للموضوع. • **استخدام الوسائط المتعددة:**استخدام الفيديوهات التعليمية، الرسوم التوضيحية، والمواقع الإلكترونية التفاعلية لشرح المفاهيم المعقدة بطرق مبتكرة وجذابة.	

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.8
Total SWL (h/sem)	150		

الحمل الدراسي الكلي للطالب خلال الفصل	

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	6, 13	LO #1, 2, 10 and 11
	Assignments	2	5% (5)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	20% (20)	Continuous	All
	Report	1	5% (5)	14	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	**مقدمة إلى المياه الجوفية** • مقدمة إلى المياه الجوفية وأنواع الأحواض المائية (المحصورة وغير المحصورة). • مراجعة الدورة الهيدرولوجية ودور المياه الجوفية فيها. • نظرة عامة على أهمية المياه الجوفية كمورد مائي.
Week 2	**الخصائص الهيدروليكية للمياه الجوفية** • المسامية والنفاذية والتوصيل الهيدروليكي. • السعة التخزينية للأحواض المائية. • مفاهيم التدفق المائي في الأحواض المائية وتفسير قانون دارسي.
Week 3	**حركة المياه الجوفية وتدفقها** • مبادئ تدفق المياه الجوفية، بما في ذلك التدفق الصفحي والتدفق المضطرب. • حسابات رأس الضغط الجوفي وتوزيع الضغط في الأحواض المائية. • قياسات تدفق المياه الجوفية: سرعة التدفق والاتجاه.
Week 4	**إعادة شحن وتصريف المياه الجوفية** • العوامل التي تؤثر على إعادة شحن المياه الجوفية (التساقط، التضاريس، ونوع التربة). • طرق قياس وإدارة إعادة الشحن. • التصريف الطبيعي والاصطناعي للمياه الجوفية.

Week 5	**تفاعل المياه الجوفية مع المياه السطحية** • علاقة المياه الجوفية بالمياه السطحية: الأنهر، البحيرات، والبحيرات الجوفية. • تأثيرات التصريف الطبيعي والاصطناعي على النظم الهيدرولوجية. • دراسة حالات عن تأثير السدود وحقن المياه.
Week 6	**استكشاف المياه الجوفية** • مقدمة في طرق استكشاف المياه الجوفية: الحفر، الجيوفيزياء، والتحليل الهيدرولوجي. • استخدام تقنيات الاستشعار عن بعد وتفسير الخرائط الجيولوجية والهيدرولوجية. • مراقبة المياه الجوفية: الأساليب والأدوات.
Week 7	**جودة المياه الجوفية والتلوث** • المصادر الطبيعية والبشرية لتلوث المياه الجوفية. • الملوثات الشائعة وتأثيرها على جودة المياه الجوفية (المعادن الثقيلة، المبيدات، والنترات). • العمليات الجيوكيميائية التي تؤثر على جودة المياه الجوفية.
Week 8	**نقل الملوثات في المياه الجوفية** • العمليات التي تتحكم في نقل الملوثات: الانتشار، النقل بالكتلة، والتفاعل الكيميائي. • دراسة حالات تلوث المياه الجوفية وانتقال الملوثات في الأحواض المائية. • مقدمة في نمذجة نقل الملوثات في المياه الجوفية.
Week 9	**إدارة المياه الجوفية** • مبادئ إدارة المياه الجوفية المستدامة. • استراتيجيات استخدام المياه الجوفية: التخزين الموسمي، السحب المستدام، وإعادة الاستخدام. • السياسات واللوائح المتعلقة بإدارة المياه الجوفية.
Week 10	**تأثير تغير المناخ على المياه الجوفية** • تأثير تغير المناخ على أنماط إعادة شحن المياه الجوفية وتوافرها. • التأثيرات البيئية لتغير المناخ على جودة المياه الجوفية. • التكيف مع تغير المناخ: الاستراتيجيات والأساليب المستخدمة للحفاظ على استدامة موارد المياه الجوفية.
Week 11	**تقنيات نمذجة المياه الجوفية** • مقدمة إلى برامج نمذجة المياه الجوفية مثل.MODFLOW • النمذجة العددية لتدفق المياه الجوفية وحساب التوازن المائي. • حالات عملية: تطبيقات النمذجة لحل مشاكل إدارة المياه الجوفية.
Week 12	**ترميم ومعالجة المياه الجوفية** • تقنيات استعادة المياه الجوفية الملوثة: الطرق الفيزيائية، الكيميائية، والبيولوجية. • دراسة حالات عن مشاريع ناجحة في ترميم المياه الجوفية. • تحليل فعالية التقنيات المختلفة لترميم المياه الجوفية.
Week 13	**القضايا المعاصرة والسياسات المتعلقة بالمياه الجوفية** .مناقشة التحديات الحالية في إدارة المياه الجوفية (الاستخدام المفرط، التلوث، والسياسات الدولية)

	.دراسة حالات حول النزاعات المائية والسياسات الدولية لحل النزاعات حول المياه الجوفية .السياسات القانونية والتشريعية المرتبطة بحماية المياه الجوفية
Week 14	**عرض المشاريع النهائية** • عرض مشاريع الطلاب المتعلقة بإدارة المياه الجوفية أو تحليل حالة تلوث المياه الجوفية. • تقييم نقدي للنتائج والاستنتاجات المستخلصة من المشاريع. • مناقشة مفتوحة حول الحلول المستقبلية لمشاكل المياه الجوفية.
Week 15	مراجعة عامة
Week 16	الامتحان النهائي.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	**مقدمة إلى أدوات المختبر وسلامة العمل** • مقدمة إلى المعدات والأدوات المستخدمة في المختبرات الهيدروجيولوجية. • إرشادات السلامة العامة في المختبر وكيفية التعامل مع المواد الكيميائية والمعدات.
Week 2	**مقدمة إلى العينات المختبرية: كيفية جمعها، تخزينها، وتحضيرها.**
Week 3	**قياس النفاذية باستخدام جهاز بيرميوميتر** • التدريب على استخدام جهاز بيرميوميتر لقياس النفاذية في عينات التربة والصخور. • حساب معامل النفاذية وتحليل النتائج. • مناقشة العوامل التي تؤثر على النفاذية، مثل نوع التربة وتدرج الحبيبات
Week 4	**تحديد المسامية والكثافة الظاهرية** • قياس المسامية والكثافة الظاهرية لعينات التربة والصخور باستخدام تقنيات مختلفة مثل طريقة النسبة الحجمية. • تحليل العلاقة بين المسامية والكثافة وتأثيرها على خصائص التخزين في الأحواض المائية. • مقارنة نتائج المسامية لمواد جيولوجية مختلفة.
Week 5	**تحليل مكونات المياه الجوفية الكيميائية** • جمع وتحليل عينات المياه الجوفية لتحديد مكوناتها الكيميائية (مثل الأملاح المعدنية والمواد العضوية). • استخدام أجهزة قياس مثل pH متر، ومقياس التوصيل الكهربائي لتحديد خصائص المياه. • تفسير النتائج وتقييم جودة المياه بناءً على المعايير البيئية.
Week 6	**استخدام البيانات الجيوفيزيائية لاستكشاف المياه الجوفية** • التعرف على تقنيات الجيوفيزياء مثل المقاومة الكهربائية وتفسير البيانات الجيوفيزيائية لاستكشاف الأحواض المائية. • تحليل البيانات الميدانية وتحديد موقع وعمق المياه الجوفية.

	• مناقشة دقة الأساليب الجيوفيزيائية وتطبيقاتها في الاستكشاف.
Week 7	**قياس سرعة تدفق المياه الجوفية باستخدام أنابيب بيزوميترية** • التدريب على تركيب وقياس أنابيب بيزومترية لقياس سرعة تدفق المياه الجوفية. • تحليل البيانات المستخلصة وحساب تدفق المياه في الأحواض المائية المختلفة. • مناقشة تأثير الخصائص الهيدروليكية على تدفق المياه الجوفية.
Week 8	**جمع العينات حقلياً:** شرح طرق جمع العينات والادوات المستخدمة في ذلك
Week 9	**تحليل البيانات**: باستخدام برامج متخصصة مثل Excel أو برامج النمذجة الهيدرولوجية.
Week 10	**مناقشة دقة البيانات وتفسير النتائج** في سياق الظروف الهيدرولوجية المحلية.
Week 11	**تحليل منحنيات الضخ** • إجراء تجارب الضخ وتحليل البيانات لتحديد خصائص الأحواض المائية مثل التوصيل الهيدروليكي والمسامية. • تفسير منحنيات الضخ واستخدامها في تصميم آبار المياه الجوفية. • مناقشة التطبيقات العملية لنتائج منحنيات الضخ في إدارة موارد المياه.
Week 12	**تقييم تلوث المياه الجوفية**:جمع وتحليل عينات من مواقع ملوثة لفهم توزيع وتركيز الملوثات.
Week 13	**تقييم استراتيجيات إعادة الشحن الاصطناعي للمياه الجوفية**
Week 14	**ادارة المياه الجوفية والخزين الاستيراتيجي**
Week 15	**مشاريع بحثية وتطبيقات عملية**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	مبادئ الهيدرولوجي ، (نظير الانصاري، 1979) علم المياه وتطبيقاته، (باقر احمد، 1982) هيدرولوجية المياه الجوفية، (ديفيد توود 1959)، ترجمة رياض حامد الدباغ، وحميد رشيد رفيق "Applied Hydrology" by Ven Te Chow, David R. Maidment, and Larry W. Mays (1988). "Introduction to Hydrology" by Warren Viessman Jr., Gary L. Lewis, and John W. Knapp (2013) "Groundwater Hydrology" by M.A. Todd and L.W. Mays	Yes

	(2004)	
Recommended Texts		No
Websites	• United States Geological Survey (USGS) Water Science School: The USGS Water Science School website offers a wide range of educational resources and information on hydrology, including articles, videos, interactive activities, and data. Visit their website at: https://www.usgs.gov/water-science-school • Hydrologic Engineering Center (HEC): HEC, a part of the US Army Corps of Engineers, provides various resources and software tools for hydrologic engineering and water resources planning. Their website offers technical documentation, publications, and software downloads. Access their website at: https://www.hec.usace.army.mil/ • National Weather Service (NWS): The NWS website provides educational materials and resources on weather and hydrology. They offer information on rainfall, river stages, flood forecasting, and more. Visit their website at: https://www.weather.gov/ • Hydrology Online: Hydrology Online is an educational platform that offers online courses, tutorials, and resources on various aspects of hydrology, including rainfall-runoff modeling, flood forecasting, and watershed management. Explore their website at: https://www.hydrologyonline.com/ • Hydrology.org: Hydrology.org is an online portal dedicated to hydrology and water resources. It provides access to articles, publications, research papers, and information on conferences and events related to hydrology. Visit their website at: http://www.hydrology.org/	

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.