MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	**Fundamental of computer**		**Module Delivery**
Module Type	**B**		☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**
Module Code	KUS1102		
ECTS Credits	**3**		
SWL (hr/sem)	**75**		
Module Level	1	**Semester of Delivery**	1
Administering Department	Environmental health Science	**College**	College of Energy and Environmental Science
Module Leader	Ahmed Adnan	**e-mail**	a.algbory@kus.edu.iq
Module Leader's Acad. Title	Assistant lecturer	**Module Leader's Qualification**	M.SC
Module Tutor	/	**e-mail**	/
Peer Reviewer Name	/	**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 Objectives أهداف المادة الدراسية	1. Hardware: Computers consist of physical components, including the central processing unit (CPU), memory (RAM), storage devices (hard drives or solid-state drives), input/output devices (keyboard, mouse, monitor), and other peripheral devices. 2. Software: Software refers to the programs and instructions that enable computers to perform specific tasks. This includes the operating system, applications, and utilities that facilitate user interaction and manage hardware resources. 3. Central Processing Unit (CPU): The CPU is the "brain" of a computer, responsible for executing instructions and performing calculations. It performs tasks such as fetching, decoding, and executing program instructions. 4. Memory (RAM): Random Access Memory (RAM) is a volatile type of computer memory that provides temporary storage for data and instructions needed by the CPU in real-time. It allows for faster data access compared to permanent storage. 5. Storage: Computers use various types of storage devices to store data and programs permanently. Hard disk drives (HDDs) and solid-state drives (SSDs) are common examples. They retain data even when the computer is powered off.

	6. Input and Output Devices: Input devices like keyboards and mice allow users to provide instructions and interact with the computer. Output devices such as monitors and printers display or produce the results of computations or data processing. 7. Operating System (OS): The operating system is software that manages computer hardware and software resources. It provides a user interface, controls system functions, and facilitates the execution of programs. 8. Algorithms and Programming: Algorithms are step-by-step procedures or instructions for solving problems or accomplishing specific tasks. Programming involves writing code using programming languages to create software that instructs the computer to perform desired functions.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the basic components of a computer system, including the CPU, memory, storage devices, and input/output devices. 2. Explain the role and functioning of the operating system in managing computer resources and facilitating user interaction. 3. Describe the binary number system and understand how data is represented and manipulated in digital computers. 4. Comprehend the concept of algorithms and their importance in solving computational problems. 5. Demonstrate knowledge of computer hardware and software interaction, including how the CPU executes instructions and interacts with memory and input/output devices. 6. Explain the basics of computer networking, including protocols, IP addressing, and

	network topologies. 7. Understand the principles of data storage and retrieval, including file systems and database management systems. 8. Analyze and evaluate the impact of emerging technologies on the field of computing, such as cloud computing, artificial intelligence, and cybersecurity. 9. Apply programming concepts to solve simple problems, including variables, control structures, and functions. 10. Demonstrate effective and safe use of computer systems, including understanding security measures and ethical considerations in computing.
Indicative Contents المحتويات الإرشادية	1. Introduction to Computers: - Evolution and history of computers - Basic computer components and their functions - Types of computers and their applications 2. Computer Hardware: - Central Processing Unit (CPU) and its architecture - Memory (RAM) and storage devices (hard drives, solid-state drives) - Input devices (keyboard, mouse, etc.) and output devices (monitor, printer, etc.) - Motherboard, power supply, and other peripheral devices 3. Computer Software: - Operating systems and their functions

	- Application software and utilities - Programming languages and software development tools 4. Data Representation: - Binary number system and conversions - Character encoding (ASCII, Unicode) - Representation of integers, floating-point numbers, and characters 5. Algorithms and Problem Solving: - Introduction to algorithms and problem-solving approaches - Pseudocode and flowcharts - Fundamental algorithms like sorting, searching, and recursion 6. Computer Networks: - Basics of computer networking - Network topologies and protocols - IP addressing and subnetting 7. Programming Concepts: - Introduction to programming languages and paradigms - Variables, data types, and operators - Control structures (conditionals, loops) and functions 8. Emerging Technologies: - Cloud computing and its applications

	- Artificial intelligence and machine learning - Cybersecurity and data privacy considerations

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Lecture Discussion Practical Experience Clarification and Ask Questions reflect on what you have learned Research and reports

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	11	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	0
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	5% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	5% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	15% (10)	Continuous	All
	Report	1	5% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	60% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Enabling students to learn about computers and computing
Week 2	Enabling students to define binary representation and data storage
Week 3	Definition of Computer Hardware and CPU Operations
Week 4	Definition of Software and Operating Systems
Week 5	Understanding the algorithms and problem solving
Week 6	Empowering students to understand computer networks and the Internet

Week 7	Empowering students to become acquainted with data representation and encoding
Week 8	Empowering students to Introduction to database systems
Week 9	Empowering students about programming concepts and Constructs
Week 10	Empowering students to get an overview of the software development
Week 11	Empowering students to acquire knowledge about fundamentals of computer security
Week 12	Empowering students to acquire knowledge about artificial Intelligence and machine Learning
Week 13	Enabling students to get an overview of emerging technologies in computing
Week 14	Empowering students to understand the privacy concerns and data protection regulations
Week 15	Review and Final Assessment
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Familiarization with computer components: CPU, RAM, storage devices
Week 2	Lab 2: Installation and configuration of an operating system (e.g., Windows or Linux)
Week 3	Lab 3: Binary number system conversion exercises
Week 4	Lab 4: Implementing simple algorithms using pseudocode
Week 5	Lab 5: Setting up a small computer network
Week 6	Lab 6: Network troubleshooting exercises
Week 7	Lab 7: Working with file systems and organizing files
Week 8	Lab 8: Introduction to a programming language

Week 9	Lab 9: Implementing user-defined functions
Week 10	Lab 10: Discussing ethical implications of computer use
Week 11	Lab 11: Collaborative project to apply learned concepts or review sessions
Week 12	Lab 12: Practice with conditional statements and loops
Week 13	Lab 13: Building modular programs
Week 14	Lab 14: Preparation for final assessments or presentations
Week 15	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	Brookshear, J. Glenn, Dennis Brylow, and S. Manasa. "Computer science: An overview." (2009).	Yes
Recommended Texts	Patterson, David A., and John L. Hennessy. Computer organization and design ARM edition: the hardware software interface. Morgan kaufmann, 2016. Petzold, Charles. Code: The hidden language of computer hardware and software. Microsoft Press, 2000.	No
Websites	Computer Science YouTube Channels: Channels like "Computerphile," Computer Science," and "MIT Open Courseware.	

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

University Name: AlKarkh University of Science

College: Energy and Environmental Science

Dept: Environmental health Science

Module Information معلومات المادة الدراسية		
Module Title	Mathematics	**Module Delivery**
Module Type	B	☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**
Module Code	KUS1101	
ECTS Credits	5	
SWL (hr/sem)	125	

Module Level		**Semester of Delivery**	
Administering Department	Environmental health Science	**College**	College of energy and environmental science
Module Leader	Maad Abdullah Hussein	**e-mail**	maad@kus.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D
Module Tutor		**e-mail**	
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date		**Version Number**	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Introducing students to mathematical concepts in the subject of linear algebra and matrices. 2. Use and apply these concepts to solve applied problems. 3. Teach students to analyze results using mathematical methods. 4. Teaching students some special functions and their properties. 5. Teaching students to mix and combine mathematical concepts with practical problems. 6. Introducing students to the importance of mathematics
Module Learning Outcomes	1. Solving mathematical problems with scientific material. 2. Writing scientific reports and analyzing data. 3. Self learning method. 4. Solving problems relevant with mathematical subject. 5. Testing the student's ability to solve mathematical problems related to the subjects

مخرجات التعلم للمادة الدراسية	he studied.
Indicative Contents المحتويات الإرشادية	1. Introduction to Linear Algebra. 2. Linear system -Linear Equations –Solution Of Linear Equations. 3. Matrix Algebra. 4. Logarithmic function. 5. Trigonometric functions. 6. Exponential function. 7. Techniques of integrations.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Lectures: Providing students with basic mathematical concepts and their practical applications. 2. Forming discussion groups during lectures to discuss mathematics topics and solve practical problems. 3. Ask the students a set of thinking questions during the lectures, such as what, how, when and why for specific topics in mathematics. 4. Giving students homework that requires self-explanations in different ways. 5. Writing scientific reports and analyzing data. 6. solving problems relevant with mathematical subject.

Student Work load (SWL) الحمل الدراسي للطالب ل 15 اسبوعاً			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	**48**	**Structured SWL (h/W)** الحمل الدراسي المنتظم للطالب خلال الفصل	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	**77**	**Unstructured SWL (h/sem)** الحمل الدراسي غير المنتظم للطالب خلال الفصل	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125 **(h/sem)**		

Module Evaluation

تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	Lo #2,#4,#6,#8,#10
	Assignments	2	10% (10)	2 and 12	Lo #1, #3,#5,#7,#9,#11
	Projects / Lab.	1	5%(5)	13	All
	Report	1	5% (5)	14	All
Summative assessment	**Midterm Exam**	2 hr	20% (20)	8	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	Matrices - the concept of matrices - some types of matrices- operations on matrices
Week 2	Determinants, Properties of the determinants ,Calculate the determinant of a 2x2 matrix and a nxn matrix.
Week 3	The Inverse - Matrix - Properties Of The Inverse - Matrix, The Transpose OperationProperties.
Week 4	practical - method for finding the Inverse the cofactor method.
Week 5	solution of linear systems using the inverse matrix- the adjutant inverse.
Week 6	solution of linear systems using The Cramer's rule.
Week 7	solution of linear systems using Gauss_ Jordan Elimination method.
Week 8	Slop of a line, equation of a line, types of line equation.
Week 9	Trigonometric functions - Derivation of trigonometric functions.
Week 10	Integration of Trigonometric Functions - Applications to Trigonometric Functions.
Week 11	Logarithmic function - properties of logarithmic function – derivation of logarithmic function.
Week 12	Integration of the logarithmic function-Applications to the logarithmic function.
Week 13	Exponential function - properties of the exponential function- derivation of the exponential function - integration of the exponential function.
Week 14	Techniques of integrations (by parts, tables)
Week 15	Techniques of integrations (partial fractions)
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Non

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

Required Texts	Larson, Ron, and Bruce H. Edwards. Calculus. Cengage Learning , Calculus 2022.	Yes
Recommended Texts	Larson, Ron. Precalculus with limits. Cengage Learing.	Yes
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
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	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	Democracy and Human Rights			**Module Delivery**	
Module Type	**B**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	KUS1103				
ECTS Credits	2				
SWL (hr/sem)	100				
Module Level		1	**Semester of Delivery**		2
Administering Department		Environmental health Science	**College**	Energy and Environmental Science	
Module Leader	Dr.Mohanad Basim Ibrahim		**e-mail**	mohanad.al.sallami@kus.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		None	**e-mail**	none	
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	تهدف المادة إلى بيان اهمية الحقوق الاصلية اللصيقة بالانسان، التي تتفق مع فطرته، والتي يقبلها العقل المجرد، والتي لا تختلف باختلاف الزمان والمكان، وهذه هي حقوق الانسان.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	تسهم المادة العلمي (لحقوق الانسان) إلى تثقيف الطالب من الناحية القانونية؛ ليكون مطلع على ماهية الحقوق الانسانية، وأصلها التاريخي، وتعريف ماله من حقوق وما عليه من التزامات، من خلال معرفة حقه وحدود ذلك الحق، وحقوق الآخرين، وما سعت إلية الدول والمنظمات الدولية والاقليمية في تعزيز مفاهيم تلك الحقوق، وإلزام الدول للنص عليها في التشريعات الداخلية، والضمانات التي تكفل تطبيق تلك الحقوق العالمية.

Indicative Contents المحتويات الإرشادية	إن المحتويات الارشادية لمادة حقوق الانسان تتلخص بتهذيب سلوك الطالب، [20hr] وتعريفه إن تعامله مع غيره من بني البشـــر يقوم على مبدأ: ((إن الناس صـــنفان؛ إما أخوٌ لك في الدين، أو نظيرٌ لك في الخلق)).[20 hr]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	نعمد في هذا الجانب إلى ما يلي: 1- يعرف الطالب إبتداءً بمضـــمون موجز عن المفردات التي ســـيتم تناولها خلال المحاضرة، ثم نوجه له بعض الإسئلة التي تحرك ذهنه، وتشد إنتباهه؛ لضمان حسن الاستماع. 2- يتم التعمق بشـــرح المفردات العلمية في حدود تناسب متوسط المستويات العلمية لضمان عدم تجاوز الفروق الفردية عند عموم الطلبة. 3- يتم ترك مساحة للنقاش الحر في إطار الموضوع المخصص للمحاضرة. 4- الحرص على جانب التغذية الراجعة للمعلومات قبل نهاية المحاضرة. 5- التواصل الكترونيًا مع الطلبة لنشر المحاضرات المسجلة، والمكتوبة من خلال الموقع الرسمي للجامعة.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**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	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	تعريف وطبيعة حقوق الإنسان, التطور التاريخي لحقوق الإنسان
Week 2	مميزات حقوق الإنسان عن غيرها من الحقوق, حقوق الإنسان في الديانات السماوية
Week 3	حقوق الإنسان في المواثيق الدولية, حقوق الإنسان في التشريعات الداخلية
Week 4	حقوق الإنسان الشخصية, الاجتماعية, الثقافية, الاقتصادية
Week 5	ضمانات حقوق الإنسان الدولية, الاقليمية
Week 6	مفهوم الحرية, الحريات الشخصية والعامة
Week 7	حرية التعبير عن الراي والمساواة امام القانون, حرية التنظيم والاقليات
Week 8	مفهوم الديمقراطية ومميزاتها
Week 9	الديمقراطية في الدستور
Week 10	أنواع الديمقراطية المباشرة وشبه المباشرة
Week 11	الديمقراطية النيابية, العلاقة بين حقوق الانسان والديمقراطية
Week 12	الجزاءات المترتبة على المساس بحقوق الإنسان
Week 13	المجتمع المدني والديمقراطية
Week 14	ضمانات حقوق الإنسان الداخلية (الوطنية)
Week 15	امتحان

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	كتاب/ حقوق الانسان (تطورها، مضامينها، حمايتها) د. رياض عزيز هادي.	Yes
Recommended Texts	كتاب/ حقوق الانسان د. حميد حنون.	No
Websites	https://www.noor-book.com/ https://www.un.org/ar/about-us/universal-declaration-of-human-rights https://ar.wikipedia.org/wiki/	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
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	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	**Analytical Chemistry**			**Module Delivery**	
Module Type	**S**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CRE1104				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Environmental health Science		**College**	Energy and Environmental Science	

Module Leader	Hasan Mohammed Luaibi	**e-mail**	hasannsr@kus.edu.iq
Module Leader's Acad. Title	Asist. Prof.	**Module Leader's Qualification**	Ph.D. in Analytical Chemistry
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 Objectives أهداف المادة الدراسية	1. Defining chemical analysis and its divisions 2. Ability to describe the processes of chemical analysis 3. Understanding the principles and types of calibration and the theoretical basis for all types of calibrations 4. Apply calibration calculations in the correct ways to calculate the concentration of the substance 5. Describe the steps of gravimetric analysis and the factors that lead to sediment solubility 6. How to calculate the gravimetric coefficient, the weight of the material to be estimated, and the percentage of the analyzed sample.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Importance of analytical chemistry. 2. Qualitative and quantitative analysis. 3. Determination, and measurement. 4. Some important units of measurement. 5. Stoichiometric. 6. Chemical equilibrium: aqueous solutions and chemical equilibrium. 7. Dissociation of water and applying solubility-product constants. 8. Buffer solution. 9. Effect of electrolytes on chemical equilibrium. 10. Titration methods & types. 11. Equivalence point, end point and Indicator.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **Part A:** Theory about important of analytical chemistry and introduction of the qualitative and quantitative analysis. [15 hrs] Characterization analysis, Determination, and measurement and calculation used in analytical chemistry and learning some important units of measurement (units for expressing concentration) [15 hrs] What is stoichiometry with examples. [10 hrs] Classification solution of electrolyte and chemical equilibrium of aqueous solutions and Equilibrium-constant expressions [15 hrs] Revision problem classes [6 hrs] **Part B :** Applying the ion product constant for water (dissociation of water) Applying solubility-product constants with introduction to the effects of pH, Applying acid-base dissociation constants. [15 hrs] The effects of pH- Buffer solution: properties of buffer mixtures, preparation of buffer solution. [7 hrs] Introduction about what are the titration methods and their types: acid-base titration, complexometric titration, precipitation titration and redox titration, the Equivalence point, end point and Indicators. [15 hrs]

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

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	60	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**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	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction of analytical Chemistry
Week 2	Classification of methods of analytical chemistry
Week 3	Some important units of measurement
Week 4	Stoichiometric
Week 5	Chemical Equilibrium & Equilibrium-constant expressions
Week 6	Mid-course First Exam
Week 7	Ion product, Applying the ion product constant for water (dissociation of water)
Week 8	The effects of pH, Applying acid-base dissociation constants
Week 9	The effects of pH-Buffer solution: properties of buffer mixtures, preparation of buffer solution
Week 10	Titration methods & types

Week 11	Equivalence point, end point and Indicator
Week 12	Theory of neutralization titrations of sample
Week 13	Acid-base indicator, titration based on acid-base reactions
Week 14	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction about analytical lab and definitions of tools and equipment that used in the lab
Week 2	Lab 2: Preparation of approximately (0.1M) HCl
Week 6	Lab 6: Gravimetric Determination of Chloride
Week 3	Lab 3: Standardization of HCl solution with standard solution of Na_2CO_3
Week 4	Lab 4: Analysis of sodium carbonate Na_2CO_3 by titration
Week 5	Lab 5: Analysis of a mixture (sodium hydroxide + sodium carbonate) buffer solution
Week 7	Lab 7: Acid–Base Titrations Experiment by Determination of Replaceable Hydrogen in Acid by Titration

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Skooge, Fundamentals of Analytical Chemistry, 2014	Yes
Recommended Texts	David Harvey, Modern Analytical Chemistry, 2000.	No
Websites	https://chem.libretexts.org/Bookshelves/Analytical_Chemistry	

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 OF PHYSICS

University Name: AlKarkh University of Science

College: Energy and Environmental Science

Dept: Environmental health Science

Module Information					
Module Title	**physics**			**Module Delivery**	
Module Type	S			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CRE1105				
ECTS Credits	7				
SWL (hr/sem)	175				
Module Level		**UGI**	**Semester of Delivery**		first
Administering Department		**Environmental health Science**	**College**	**Energy and Environmental Science**	
Module Leader	Dr.Tabark Abdulabass		**e-mail**	tabarak@kus.edu.iq	
Module Leader's Acad. Title		Lecture doctor	**Module Leader's Qualification**		Ph.D.
Module Tutor	Mohammed obaid		**e-mail**		
Peer Reviewer Name			**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- becomes able to know 1. Measurement units and coordinates. 2. Object movement and the use of vectors. 3. Distinguish between work and energy and the relationship between them

	4- Understand electric charge and electric field. 5- Knowing the materials. 6- Identify the electric field of charges and electric field lines. 7- Identifying the forces, moments and electric potential energy. 8- Learn about Causs' law ,Ohm's Law, Coulomb's law.
Module Learning Outcomes	Make the student able to: 1- Determine the coordinates and units of measurement used. 2. Applying Newton's laws of motion 3-Understand electric charge and electric field. 4- Knowing the composition of the material. 5- Know the types of matter. 6- Know the types of electric charge. 7- Learn about Coulomb's law. 8- Identify the electric field of charges and electric field lines. 9- Identifying the forces, moments and electric potential energy. 10- Learn about Causs' law.
Indicative Contents	Indicative content includes the following. Physical Quantities Units, and vectors ,Motion Along a straight Line, Motion in two dimensions,Newton's Laws of Motion,Work and kinetic energy electric charge and electric field, electric charge and structure of matter, types of matter, charge is conserved, charging by induction and friction,electric forces on uncharged objects, Coulomb's law, electric field, electric field on a point charge, electric field calculations, electric field lines, electric dipole, forces, moments and electric potential energy, Causs' law.

Learning and Teaching Strategies	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students and by oral, written exams and homeworks

Student Workload (SWL)			
Structured SWL (h/sem)	79		5
Unstructured SWL (h/sem)	96		
Total SWL (h/sem)	175		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	4	20% (20)	2, 5, 10, 12	
	Assignments	2	5%(5)	2, 12	
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	5% (5)	13	
Summative assessment	**Midterm Exam**	2 hr	10% (10)	8	
	Final Exam	4hr	50% (50)	16	
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	1. Fundamentals of physics.
Week 2	2. Coordinates and units of measurement used in the field of physics
Week 3	3. The motion of bodies and the application of Newton's laws.
Week 4	4. The relationship between work and energy
Week 5	5 - Analysis of the influencing forces
Week 6	Analysis of the influencing forces
Week 7	electric charge, electric field, electric charge and structure of matter.
Week 8	Mid exam + types of matter, charge is conserved, charging by induction and friction

Week 9	electric forces on uncharged objects, Coulomb's law
Week 10	electric forces on uncharged objects, Coulomb's law
Week 11	electric field, electric field on a point charge,
Week 12	electric field calculations, electric field lines,
Week 13	electric dipole, forces, moments and electric potential energy
Week 14	Causs' law, electric flux and the enclosed charge
Week 15	**Preparatory Week**
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered
Week 1	Lab 1: Ohms law and Ohmic and Non Ohmic materials
Week 2	Lab 2: Diffraction grating
Week 3	Lab 3: Archimedes principle
Week 4	Lab 4: Spiral spring
Week 5	Lab 5: Simple pendulum
Week 6	Lab 6: speed and sound
Week 7	Lab 7: The flywheel

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	Edward M.Purcell, Electrisity and magnetism,3rd edition	yes
Recommended Texts	University physics with modern physics, 13th edition	Yes
	University Physics, 13th Edition Hugh D. Young and Roger A. Freedman	yes

	Addison-Wesley publishing.	
	Physics for Scientists and Engineers with Modern Physics, Ninth Edition .Raymond A. Serway and John W. Jewett, Jr	yes

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

نموذج وصف المادة الدراسية

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Ecology**			**Module Delivery**	
Module Type	**C**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	EHS1106				
ECTS Credits	7				
SWL (hr/sem)	175				
Module Level	1		**Semester of Delivery**	2	
Administering Department	Environmental health Science		**College**	Energy and Environmental Science	
Module Leader			**e-mail**		
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**	1.0	

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	ECOLOGY – Introduction and terms,
Week 2	Branches of Ecology
Week 3	BASIC PRINCIPLES OF ECOSYSTEM
Week 4	Food chains, Food webs and Ecological pyramids
Week 5	Functions of an Ecosystem:
Week 6	Biogeochemical Cycles- Gaseous cycles
Week 7	Biogeochemical Cycles- sedimentary cycle
Week 8	Primary productivity
Week 9	Environmental Factors Affecting the Productivity in Ecosystem
Week 10	Biological interrelationships
Week 11	Limiting factors & tolerance levels
Week 12	Liebige's law of minimum , Shelford's law of tolerance
Week 13	Aquatic Ecosystem
Week 14	Biodiversity and Conservation
Week 15	Human population and the Environment

Week 16	

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Week 1	Lab safety
Week 2	Introduction to Practical Ecology
Week 3	Humidity
Week 4	Temperature
Week 5	Atmospheric Pressure
Week 6	Some instrument and devices are used in Ecology
Week 7	Ecology sampling methods
Week 8	Soil sampling and texture
Week 9	Water sampling
Week10	Air sampling
Week11	

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية		
Module Title	human cytology	**Module Delivery**
Module Type	C	☒ **Theory**

Module Code	EHS1207			☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
ECTS Credits	7				
SWL (hr/sem)	175				
Module Level	1		**Semester of Delivery**	2	
Administering Department	Environmental Health Science	**College**	Energy and Environmental Science		
Module Leader	Aqeel M. Ali		**e-mail**		
Module Leader's Acad. Title	Assistant prof.		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Sarah Raad Mohammed		**e-mail**	sarah.raad@kus.edu.iq	
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 Objectives أهداف المادة الدراسية	1. To understand the fundamental principles of cell biology and human cytology. 2. - To examine the structure and function of different cell types and organelles. 3. - To explore the molecular mechanisms of cellular processes. 4. - To analyze the role of cells in human health and disease.

	5. - To develop skills in laboratory techniques and data analysis in cytology.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. discuss the study of cell biology/cytology briefly 2. discuss in detail at least 3 constituents of the cell structure 3. describe the different phases of cell cycle 4. state the role of cell division in reproduction 5. discuss briefly on cellular growth and differentiation 6. study of cell types
Indicative Contents المحتويات الإرشادية	1. Learn about the history and method of discovering the living cell and its basic components, and the role of electron and optical microscopy in shedding light on the smallest cellular details and their different shapes and types. 2. Identifying the importance of the living cell in transmitting hereditary traits between generations, the role of the nucleus in preserving hereditary traits and the chromosomes and hereditary genes it contains, and how to preserve these traits through the process of cell division and controlling them. 3. Differentiation of living cells and how the formation and growth of the embryo 4. Studying the metabolic and chemical processes that occur inside the living cell and their role in the continuation of human life 5. Learn about the mechanism of communication between cells and how they work as tissues specialized in a specific work

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Method of lecturing 2. Student Center 3. Team Project 4. Work Shop 5. Scientific trips to monitor environmental pollution 6. Learning Technologies on Campus 7. Experiential Learning 8. Application Learning

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

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	96	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**175**		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Cytology

Week 2	Cell Structure and Function
Week 3	Control of the cell cycle and checkpoints
Week 4	Cellular Communication and Signal Transduction
Week 5	Cellular Metabolism and Bioenergetics
Week 6	ATP production and energy transfer
Week 7	Exam 1
Week 8	Cellular Adaptations and Responses
Week 9	Cellular responses to stress and injury
Week 10	Cellular Basis of Diseases
Week 11	Cytology of infectious diseases
Week 12	Genetic diseases and chromosomal abnormalities
Week 13	Immune cell cytology and autoimmune diseases
Week 14	Cytopathology of organ-specific diseases (e.g., liver, kidney, lung)
Week 15	Exam 2

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Laboratory safety
Week 2	Lab 2: **Microscope**
Week 3	Lab 3: **Microscope Calibration**
Week 4	Lab 4: Microscopy: types and applications

Week 5	Lab 5: cellular organelles
Week 6	Lab 6: shapes of the cells
Week 7	Lab 7: Cell culture techniques and maintenance
Week 8	Lab 8: cell division (mitosis & meiosis)
Week 9	Lab 9 : Staining techniques: histological and cytochemical staining
Week 10	Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Chandar, Nalini, and Susan Viselli. *Cell and molecular biology*. Lippincott Williams & Wilkins, 2012.	No
Recommended Texts	Alberts, B., Bray, D., Hopkin, K., Johnson, A.D., Lewis, J., Raff, M., Roberts, K. and Walter, P., 2015. *Essential cell biology*. Garland Science.	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
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
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Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Organic Chemistry**			**Module Delivery**	
Module Type	**S**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CRE1208**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		**1**	**Semester of Delivery**		**2**
Administering Department		Environmental health Science	**College**	Energy and Environmental Sciences	
Module Leader	Dr. Hasan Mohammed Luaibi		**e-mail**	hasannsr@kus.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	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	6. Description of the basics and principles of organic chemistry, the quality of chemical compounds, and the basis for their formation and composition 7. Knowledge and application of traditional methods of chemical organic preparation depending on the nature and conditions of the chemical reaction 8. Understanding organic chemical experiments and their steps 9. Understanding the formation of hydrocarbon chains, types of organic classes, types of organic active groups, chemical interaction 10. Knowledge of the theoretical foundations of the sections and branches of organic chemistry, and the steps of reactions and preparation in the laboratory or laboratory 11. Industry and methods of reactions available for the manufacture of organic compounds and the catalyst and its mechanism
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. That the student be able to define organic chemistry and its divisions 2. That the student be able to describe the sections and categories of organic chemistry 3. That the student be able to understand the principles, types and theoretical basis for each type of organic compounds 4. To be able to apply chemical reaction conditions such as heat or pressure to prepare the organic compound 5. Describe the steps of an organic reaction and study it from the point of view of spontaneous or non-spontaneous occurrence 6. How to explain the presence of the catalyst and the effect of the presence of active groups for each organic variety
Indicative Contents المحتويات الإرشادية	**1. Introduction to Organic Chemistry** A) Carbon bonding in organic chemistry. B) The types of functional groups in organic compounds. C) Classification of hydrocarbon compounds. **2. Nomenclature, Preparation and reaction of:** A) The saturated hydrocarbon compounds (alkanes). B) Cyclic saturated hydrocarbon compounds (cycloalkanes) C) unsaturated hydrocarbon compounds (alkenes) D) Cyclic unsaturated hydrocarbon compounds (cycloalkenes)

	E) unsaturated hydrocarbon compounds (alkynes) F) Alcohol. G) Aldehydes. H) Ketones I) Other Organic Compounds (Carboxylic acids, Ethers, Phenols, Amines) K) The Benzene and Nomenclature, Preparation and reaction. **3. Physical Properties of Organic Compounds** Boiling Points, Solubility and other properties

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	9. Method of lecturing 10. Student Center 11. Team Project 12. Work Shop 13. Scientific trips to monitor environmental pollution 14. Learning Technologies on Campus 15. Experiential Learning 16. Application Learning

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	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**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**	3	6% (6 marks)	5,9,13	LO #1, #2 and #10, #11
	Assignments	2	14% (14 marks)	2-14	LO #3, #4 and #6, #7
	Lab. Exam.	1	6% (6 marks)	11	All
	Reports of lab. experiments	7	14% (14 marks)	2,4,6,8,10,12,14	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Organic Chemistry
Week 2	The alkanes: nomenclature and preparation.
Week 3	The reaction of alkanes.
Week 4	Cyclic saturated hydrocarbon compounds (cycloalkanes).
Week 5	The alkenes: nomenclature and preparation.
Week 6	The reaction of alkenes.

Week 7	**Midterm Exam**
Week 8	Cyclic saturated hydrocarbon compounds (cycloalkenes).
Week 9	Unsaturated hydrocarbon compounds (alkynes).
Week 10	Alcohols
Week 11	Aldehydes
Week 12	Ketones
Week 13	Other Organic Compounds (Carboxylic acids, Ethers, Phenols, Amines)
Week 14	The Benzene and Nomenclature, Preparation and reaction.
Week 15	Physical Properties of Organic Compounds
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Determination of melting point
Week 2	Lab 2: Determination of boiling point
Week 3	Lab 3: Purification of solid organic compounds
Week 4	Lab 4: Purification of liquid organic compounds-simple distillation
Week 5	Lab 5: Purification of liquid organic compounds-fractional distillation
Week 6	Lab 6: Differential Extraction
Week 7	Lab 7: Chromatography

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Bruice, P. Y., Organic Chemistry, 7th Edition, 2014, Pearson Education, Inc.	No
Recommended Texts	Bruice, P. Y., Organic Chemistry, 7th Edition, 2014, Pearson Education, Inc.	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	**Geology**			**Module Delivery**	
Module Type	**S**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CRE1209				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	1		**Semester of Delivery**	2	
Administering Department	Environmental Health Science		**College**	Energy and Environmental Science	
Module Leader	Maad Abdullah Hussein		**e-mail**	maad@kus.du.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Clarification of how micropaleontology can make significant contributions to a wide range of scientific problems in geosciences. 2. Identify two microfossil groups (ostracode and calcareous nannofossil) which are useful in Geosciences. 3. This course deals with the basic concept of the most important and discriminatory morphological characters, anatomical, and taxonomic aspects of each fossil group. 4. Learn about the most important scientific terms (Terminology) and their definitions related to this topic. 5. To understand and comprehend the impact of these groups on ecology, distribution, and paleoecology. 6. To perform different micropaleontology applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. List with description, the different groups of organisms and the kingdoms that belong to them. 2. Define the various terms associated with micropaleontology. 3. What is ostracode? Definition, measurement of valves, orientation and importance in geoscience. 4. Summarize what is meant by external and internal features and structures of ostracode. 5. Discuss the reaction and involvement of ostracode in paleoecology, distribution, paleoclimat and stratigraphy. 6.Define Coccoliths, coccolithophores and Coccolithophores and the Biosphere. 7. Identify the Coccoliths and Coccolithogenesis. 8. Explain the Coccolith morphology and formation. 9. List and Describe the Ecology and distribution of Coccolithophores. 10. Discuss the Functions of coccoliths. 11. Identify the relation of coccolith with climate changes. 12. Terminology.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theoretical lectures</u> Introduction, organisms groups , types of microfossils, taxonomic position , general characteristic of ostracoda, importance of ostracoda study (as microfossils), morphology of ostracoda, calcareous parts , outer lamella, inner lamella, description of margins, features and structures used for the orientation of the carapace, external feature, internal features, terminology of ostracode, dimorphism. [*10* hrs]

	,Ecology, distribution of marine ostracoda, factors controlled of the distribution of ostracoda, distribution of environments according to the salinity levels, Paleoecology. [*8* hrs] Primary producers in the sea, primary Production, coccolithophores, coccolithophores and the biosphere coccoliths and coccolithogenesis, nannofossils, nannoplankton, coccolith morphology and formation, heterococcoliths, holococcoliths, nannoliths. [*10* hrs] Ecology of coccolithophores, coccoliths and sedimentology, functions of coccoliths, geologic distribution, effect of global climate change on distribution, evolutionary responses, terminology of calcareous nannofossils. [8 hrs] Revision problem classes [3 hrs] Part B – Practical labs Shape, Overlap, measurements of carapace and valves, orientation, external features, external structures, internal features, internal structures, inner lamella, outer lamella, Hinge line, ornamentation, description of some index species. [18 hrs] coccolith shape, coccoliths orientation, Coccolith size, ultrastructure, types of ultrastructural component, element arrangement , structures spanning central-area, orientation in plan view, structures closing central-area, crystallography, systematic paleontology, description of some index species. [18 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' perceptions about this science and its contents it includes that help in stratigraphic, paleoecologic, and paleoclimatic analysis. In addition to the use of different microscopes in distinguishing the types of microfossils through observations of the external and internal structures and their diagnosis. This will be achieved through lectures, labs, and interactive tutorials and by types of practical diagnostic methods for microfossils and involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	86	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	0
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)
المنهاج الأسبوعي النظري

	Material Covered
Week 1	Structure of earth
Week 2	Crust and mantle and core composition
Week 3	Types of spheres
Week 4	Crystal
Week 5	Minerals (classifications)
Week 6	Rocks type

Week 7	Igneous rock
Week 8	Rock cycle in nature
Week 9	Soils types and classifications
Week 10	Structure geology
Week 11	Bedding strata
Week 12	Earth Materials and Processes
Week 13	Faulting types and component
Week 14	Joints type and classification
Week 15	Environmental Geology

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Kious, Jacquelyne; Tilling, Robert I. (1996). "Understanding Plate Motions". This Dynamic Earth: The Story of Plate Tectonics. Kiger, Martha, Russel, Jane (Online ed.). Reston, VA: United States Geological Survey. ISBN 978-0-16-048220-5. Archived from the original on 10 August 2011. Retrieved 13 March 2009.	Yes Yes
Recommended Texts	Zheng, Y؛ Fu، Bin؛ Gong، Bing؛ Li، Long (2003). "Stable isotope geochemistry of ultrahigh pressure metamorphic rocks from the Dabie–Sulu orogen in China: implications for geodynamics and fluid regime". Earth-Science Reviews. ج. 62: 105–161. Bibcode:2003ESRv...62..105Z. DOI:10.1016/S0012-8252(02)00133-2. Condomines, M؛ Tanguy، J؛	Yes No
Websites		

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

نموذج وصف مادة اللغة العربية

Module Information معلومات المادة الدراسية					
Module Title	Arabic Language			**Module Delivery**	
Module Type	**B**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	KUS12010				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level		1	**Semester of Delivery**		1

Administering Department	Environmental health Science	**College**	Energy and Environmental Science
Module Leader	Dr. Ahmed kahlaf	**e-mail**	Ahmed.k@kus.edu.iq
Module Leader's Acad. Title	Assistant lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date		**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- تعلم العربية السليمة كونها اللغة الرسمية للوطن 2- اللغة جوهر الهوية ورمزها 3- اللغة تختلف عن اللهجة، فالاولى عالمية والثانية محلية 4- توظيف المفردات الفصيحة في الصياغة الاكاديمية للبحوث العلمية مترجمة بنظيرها الفصيح 5- التمكّن من كتابة البحوث والمقالات ذات المحتوى العلمي الصرف باللغة العربية الفصحى 6- تجنب الاخطاء الشائعة في الكتابة واختيار المفردات الصائبة 7- اثراء الخزين المعجمي لدى الطالب للمساعدة في بناء كاريزما التواصل الكلامي 8- الاطلاع على نماذج من الادب العربي شعرا ونثرا لما لها من اساس في بناء الجانب الثقافي المتنوع لدى الطالب 9- كتابة الاعداد بتمكّن فضلا الكتابة الصحيحة في صياغة الطلبات الرسمية 10- التعرف على الدرس الصوتي في اللغة العربية وعلاقته بعلم الفيزياء

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	عند انتهاء مفردات المادة الدراسية يكون الطالب متمكنا من: 1- الكتابة السليمة خالية من الاخطاء 2- التعبير العلمي الاكاديمي الصحيح 3- استعمال المفردات الفصيحة توظيفا ونطقا 4- اضافة رصيد لغوي ومفاهيم جديدة لمعاني الكلمات 5- القدرة على المخاطبة الادارية في الطلبات الرسمية
Indicative Contents المحتويات الإرشادية	1ـ لكل تخصص لغته التي تومئ اليه، وتدل عليه، ولغة كل علم تنبع من طبيعة كننه، فالاختصاصات العلمية لها معجم خاص بها يعبر عن جوهرها ومضمونها، فضلا عن المصطلحات الخاصة بها التي تدل عليها، وكذلك المصادر العلمية التي يُرجع اليها، والحال كما في اللغة الادبية؛ فهي ايضا لها مفرداتها وطريقة كتابتها والتعبير بها وعبرها، ومصطلحاتها الخاصة بها التي تعبر عنها وتدل عليها.[4 hrs] 2ـ المعاجم – بشكل عام - على اختلاف موارها تمثل محتوىً وكنفا لمفردات اي لغة مقترنة بالشرح والتفسير لتلك المفردات، اما المعاجم في اللغة العربية فهي واسعة ومتنوعة؛ فهناك معاجم غير معجمات اللغة، فالعربية فيها اول معجم جغرافي في التاريخ، معجم البلدان لـــ (ياقوت الحموي)، فضلا عن المعاجم المتخصصة في جزئية معينة، مثل معاجم البلاغة، فضلا عن تنوع المدارس في تأليف المعاجم وتبويبها وطريقة البحث عن المفردة فيها.[4 hrs] 3ـ العلامة تندرج ضمن حقل علم السيمياء او السيميائية، وعلامات الترقيم من المواضيع المهمة بالأخص في البحوث الاكاديمية، بغض النظر عن التخصص، سواء كان التخصص علميا، او انسانيا، من هنا تأتي اهمية علامات الترقيم؛ فلها دور سيميائي، ودلاليّ مهم في الكتابة النّصيّة وفي بناء النص، فهي تُسهّل الفهم على القارئ، وتوضح المعنى المقصود، عبر القراءة والتلفّظ بالعبارة، فعلامات التّرقيم خير وسيلة لإظهار الصّراحة وبيان الوضوح في الكلام المكتوب؛ لأنّه يدلّ النّاظر إلى تلك العلامات الاصطلاحيّة وعلى العلاقات التي تربط أجزاء الكلام بعضها ببعض بوجه عام، وأجزاء كلّ جملة بوجه خاص، وكما يقول المتخصصون عن علامات الترقيم: بأن الوقف ليس مستقلّاً، وإنّما هو من توابع التّفكير، أي: إنّ السّكتات المقرّرة بمقادير مضبوطة في مواضع معينة، ليست مجرد محطّات تنفسيّة بالمعنى البيولوجيّ للتّنفس، وإنّما في المقام الأوّل وقفات معنويّة. فالعبرة من النّاحية اللّغويّة ليست بأن يستعيدَ القارئ نفسَه، بل المهم أن يتعاطى القارئ السكتَ بمقاديرَ معلومة، وفي مواضعَ محددة من السلسلة المنطوقة رفعاً للَبس، وصوناً لمقصد المتكلّم عن التبدّل، فهذه العلامات تجسيد لمشاعر الكاتب وقصدياته فيها.[4 hrs] 4ـ الاسلوب الكتابي يمثل بصمة للكاتب الذي يصدر عنه، ويتجسد عند القارئ، ولكل كاتب اسلوبه الخاص به، ينعكس ذلك في نتاج الكاتب، وللأسلوب انواع مختلفة، فهناك الاسلوب العلمي، والاسلوب الادبي، والاسلوب الخطابي، ولكل نوع خصائصة، وقالبه الذي يتكون فيه.[4 hrs] 5ـ الاحداث التي تقترن بالزمن تمثل الافعال، والأفعال في العربية تناظر الازمنة في اللغات الاخرى من جانب معين، او من جزئية معينة، والعربية تحتوي على عدد كبير من الجذور، جذور الأفعال، ففي العربية أفعال ثلاثية ورباعية وخماسية وسداسية، والفعل جزء مهم من اجزاء الكلام الاساسية، فضلا عن الجانب الصوتي في هذه الجذور، فعلم (الأصوات الفيزيائي) من العلوم المهمة في اللغة العربية، إذ يُعد علم (الأصوات الأكوستيكي) علما أقرب إلى الفيزياء منه للعلوم الإنسانية، وهو يمثل المرحلة الوسطى بين علم الأصوات النطقي وعلم الأصوات السمعي، وعلاقته مع اللغة العربية انطلاقا من البذرة الاولى في دراسة مخارج الحروف فيزيائيا ودلاليا.[4 hrs] 6ـ الكلام عن الشعر لا ينتهي؛ فالشعر تجسيد لمشاعر الفرد المتمثل بالشاعر، والمشاعر الجمعية للانسانية جمعاء، فهو موجود لدى كل بني البشر، والشعر العربي القديم كان بمثابة نشيدا وطنيا لهم، يمثل هويتهم الثقافية الرصينة ويمثل سجلا لتاريخهم وأمجادهم، على اختلاف اغراضه من غزل ومدح ورثاء وغير ذلك، وبحور الشعر في الشعر العربي مبنية بناء صوتيا فريدا عبر التفعيلات التي وضعها الخليل بن احمد الفراهيدي ووضع فلسفتها وكنهها وقواعدها، والشعر رصيد ثقافي، وحجة في الكلام، وزينة ورونقا يضاف على شخصية الفرد والمجتمع بشكل عام.[4 hrs]

Indicative Contents المحتويات الإرشادية	7ـ الهمزة من المواضيع الاجرائية لدى الفرد الكاتب، بغض النظر عن التخصص، فيحتاجها كل فرد ناطق كاتب بها، فلها قواعدها التي تصدر عنها، وتُكتب بالشكل السليم منها، فموضوع رسم الهمزة من الاهمية بمكان؛ فرسمها يغير من المعنى، فلا بد من وضعها ورسمها بالشكل الصحيح لتوخي التعبير الدقيق عن المعنى المقصود.[8 hrs] 8ـ المفاعيل في اللغة العربية، من الموضوعات المهة في درس اللغة العربية، ولا بد لكل دارس من معرفتها بشكل عام، وهناك آراء مختلفة بين البلاغيين والنحويين عن المفاعيل، هل ان تلك المفعولات فضلة، أم أنها ركن رئيس في الجملة ؛ فالنحويون يرون انها فضلةً في الجملة، وأن ركني الجملة الأساسيين هما: الفعل، والفاعل ، وأما البلاغيون فيرون :إنها ليست فضلة، وإنما هي ركن أساسي في الجملة؛ لأن كل كلمة تَدُل على معنى في الجملة، واذا ما دلت على معنى فلا تُعد فضلة، وإنما هي ركن رئيس في الجملة وبنائها، ورأي البلاغيين أقرب للصواب من رأي النحويين، فدراستها في العربية لغير المختصين مما يضيف لهم خزينا تعبيريا متنوعا.[4 hrs] 9ـ من المعروف وجود ظاهرة الأخطاء اللغوية نحويةً كانت أو املائية أو اسلوبية، عند متحدّثي اللغة العربية وبالأخص عند غير المختصين بها ولا سيما مَن يعملون في مجال الاعلام، وهذه الظاهرة اتسعت وزاد انتشارها في العصر الحديث، فأخذت هذه الأخطاء تغزو مجالات الدراسة جميعها، من ذلك موضوع (العدد) في اللغة العربية، فنجد كثيراً من الطلبة وكذلك من عامة الناس يستعملون الأرقام بدلاً من كتابتها بالحروف؛ وذلك لتجنب الوقوع في الخطأ وهذا دليل ضعف لا يليق بالدارس أياً كان تخصصه؛ ولهذا فموضوع العدد وقواعد كتابته في اللغة العربية موضوع لا غنىً عنه في زمن لغة الأرقام.[8 hrs] 10ـ هناك مجموعة من الالفاظ متداولة بشكل كبير، تُستعمل في غير مكانها الصحيح، وفي غير ما وُضعت له وهذه الالفاظ تُستعمل في المخاطبات الرسمية الادارية بالمعنى غير الصحيح او الدقيق الذي تحمله تلك الألفاظ من معاني، فضلا عن أهمية توخي الدقة في هذه الألفاظ توظيفا لها في الطلبات الرسمية التي تُقدم على اختلاف موضوعاتها، فالطلب لا بد من ان يكون مختصرا مركزا، يعطي الفكرة الموجزة، والهدف المقصود منه ازاء صاحب الادارة الذي تُقدم اليه الطلبات، وما في ذلك من ايجابيات العمل في التخفيف واختصار للجهد والوقت في تنفيذ المهام الادارية الموكلة الافراد على اختلاف درجاتهم.[8 hrs]
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	صناعة شخصية متكاملة للطالب الجامعي من حيث التخصص العلمي الدقيق والتخصص المساند

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**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	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	
	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	الفرق بين اللغة العلمية واللغة الادبية
Week 2	المعاجم العربية وانواعها
Week 3	علامات الترقيم
Week 4	الاسلوب
Week 5	الأفعال – أنواعها وتقسيماتها
Week 6	نماذج مختارة من الشعر العربي القديم - الشعر الاسلامي - الشعر الاموي
Week 7	Mid-term Exam
Week 8	رسم الهمزة / همزة الوصل وهمزة القطع
Week 9	كتابة الهمزة بداية الكلام وآخره

Week 10	المبتدأ والخبر – مهارات كتابة العدد
Week 11	المفاعيل / المفعول به – المفعول لأجله
Week 12	المفعول معه – المفعول فيه – المفعول المطلق
Week 13	النثر العربي
Week 14	الأخطاء الشائعة – طريقة كتابة الطلبات الرسمية
Week 15	نماذج مختارة من الشعر العباسي والشعر الحديث
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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

مصادر التعلم والتدريس

	1- كتاب: العربية الجامعية لغير المتخصصين / د. عبده الراجحي **2-** كتاب: النحو التطبيقي / د. عبده الراجحي **3-** الصرف التطبيقي / د. عبده الراجحي **4-** النحو الوافي / عباس حسن **5-** تاريخ الادب العربي / شوقي ضيف	**Available in the Library?**
Required Texts		
Recommended Texts		
Websites	شبكة الفصيح لعلوم اللغة العربية	

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**			**Module Delivery**	
Module Type	**B**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	KUS12011				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level		1	**Semester of Delivery**		2
Administering Department		Environmental health Science	**College**		College of Energy and Environmental Science
Module Leader	Mohammed Abbas Kadhom		**e-mail**		kadhom@kus.edu.iq
Module Leader's Acad. Title		Assistant Prof.	**Module Leader's Qualification**		Ph.D.
Module Tutor	/		**e-mail**		/

Peer Reviewer Name	/	**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 Objectives أهداف المادة الدراسية	1. Vocabulary and Grammar: Introduce learners to essential English vocabulary and grammar structures, allowing them to understand and construct basic sentences and expressions. 2. Listening Skills: Develop learners' ability to comprehend simple spoken English in various contexts, such as greetings, introductions, and everyday conversations. 3. Speaking Skills: Enable learners to engage in basic conversations using appropriate vocabulary, grammar, and pronunciation. Learners will gain confidence in expressing their ideas, opinions, and preferences.

	4. Reading Skills: Improve learners' reading comprehension skills by exposing them to short texts and passages on familiar topics. Learners will practice extracting meaning from the text and understanding main ideas and details. 5. Writing Skills: Enhance learners' ability to write simple sentences and short paragraphs with correct grammar, spelling, and punctuation. Learners will focus on expressing themselves coherently and accurately in written form. 6. Pronunciation and Intonation: Help learners develop clear pronunciation and intonation patterns, enabling effective oral communication and comprehension. 7. Cultural Awareness: Introduce learners to cultural aspects of English-speaking countries, promoting understanding and sensitivity toward cultural differences in language use. 8. Everyday Communication: Provide learners with practical language skills for everyday situations, such as greetings, introducing themselves and others, ordering food, asking for directions, and making basic inquiries. 9. Language Strategies: Equip learners with strategies to improve their language learning, including techniques for vocabulary acquisition, self-study, and independent practice. 10. Confidence and Fluency: Foster learners' confidence in using English and develop their fluency through various speaking and interactive activities. 11. Lifelong Learning: Encourage learners to cultivate a lifelong learning attitude towards English language acquisition, motivating them to continue expanding their language skills beyond the module.
Module Learning Outcomes	1. Understand and use basic English vocabulary and expressions related to daily life,

مخرجات التعلم للمادة الدراسية	including greetings, introductions, and common objects. 2. Comprehend and respond appropriately to simple spoken English in familiar contexts, such as basic conversations, instructions, and short presentations. 3. Construct grammatically correct and meaningful sentences using basic grammar structures, including verb tenses, pronouns, and basic sentence patterns. 4. Read and understand simple texts and passages on familiar topics, extracting main ideas and specific details. 5. Write simple sentences and short paragraphs with appropriate grammar, spelling, and punctuation, expressing ideas clearly and coherently. 6. Engage in basic conversations and interactions, demonstrating effective communication skills in everyday situations. 7. Demonstrate improved pronunciation and intonation patterns, enabling clearer oral communication. 8. Develop cultural awareness and sensitivity towards English-speaking cultures, recognizing and respecting cultural differences in language use. 9. Demonstrate increased confidence and fluency in using English to communicate ideas, opinions, and preferences. 10. Apply critical thinking skills to analyze and evaluate simple texts and language use.
Indicative Contents	

المحتويات الإرشادية	1. Unit 1: Introduction - Greetings and introductions - Personal information (name, age, nationality) - Basic expressions for everyday communication 2. Unit 2: Everyday Life - Describing daily routines and activities - Expressing likes and dislikes - Talking about hobbies and interests 3. Unit 3: People and Places - Describing people's appearances and personalities - Talking about family members and relationships - Asking for and giving directions 4. Unit 4: Food and Drinks - Vocabulary related to food and beverages - Ordering food and drinks at a restaurant or café - Talking about preferences and dietary restrictions 5. Unit 5: Shopping - Vocabulary related to shopping and clothes - Describing clothing items and sizes - Making inquiries and purchasing items 6. Unit 6: Travel and Transport - Vocabulary related to travel and transportation

	- Asking for and giving travel information - Describing modes of transportation and travel experiences 7. Unit 7: Leisure Activities - Talking about leisure activities and hobbies - Discussing weekend plans and free time activities - Making suggestions and invitations 8. Unit 8: Daily Life Skills - Talking about personal routines and habits - Describing abilities and skills - Making requests and giving instructions 9. Unit 9: Health and Well-being - Discussing health and common ailments - Describing symptoms and seeking medical assistance - Giving advice and talking about healthy habits 10. Unit 10: Social Interactions - Engaging in small talk and social conversations - Discussing current events and popular topics - Sharing opinions and perspectives

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Lecture Discussion Experimental Quizzes Speaking tasks Written assignments Evaluation methods to track their language development

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ 13 اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**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	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**50**		

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

	Projects / Lab.	1	15% (10)	Continuous	All
	Report	1	5% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	60% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to English Language Basics
Week 2	Language Basics
Week 3	Greetings and Introductions
Week 4	Everyday Conversations
Week 5	Vocabulary Expansion
Week 6	Expressing Likes and Dislikes
Week 7	Describing People and Places
Week 8	Describing Objects
Week 9	Daily Activities
Week 10	Daily Routines
Week 11	Reading Skills Development
Week 12	Reading Skills Development
Week 13	Writing Skills Development

Week14	Writing Skills Development
Week 15	**Preparatory week before the final Exam**

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Soars, John, and Liz Soars. New headway: Beginner student's book. Oxford: Oxford University Press, 2010.	Yes
Recommended Texts	Soars, Liz, John Soars, and Amanda Maris. "American Headway Starter: Teacher's Book."	No
Websites	English language learning websites and mobile applications for additional practice and reinforcement	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**environmental health principle**			**Module Delivery**	
Module Type	**C**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	EHS12012				
ECTS Credits	7				
SWL (hr/sem)	175				
Module Level		1	**Semester of Delivery**		2
Administering Department		Environmental Health Science	**College**	Energy and Environmental Science	
Module Leader	Dr. Zahraa J. Jameel		**e-mail**	Dr.zahraa.j@kus.edu.iq	
Module Leader's Acad. Title		Assistant prof.	**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 Objectives أهداف المادة الدراسية	12. To impart and generate knowledge that pertains to effective recognition and response to environmental health problems. 13. To acquaint the students with the knowledge of prevailing communicable disease, their mode of transmission and methods of controlling the biological and physical environment so as to prevent them. 14. To impart the basic knowledge of physical, sociological and biological theories, concepts and principles and application of these in the practice of environmental health. 15. To impart skills and relevant methods used in identification, diagnosis and management of environmental health hazards. 16. To impart on the students attitude of team work, leadership and scientific enquiry in relation to every aspect of his professional activities. 17. To equip students with relevant knowledge and skill for advanced training and research in environmental health.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	7. That the student be able to define environmental health 8. That the student be able to describe the epidemiology 9. That the student be able to understand the principles, types and theoretical basis for each type of environmental health 10. To be able to understand the effect of climate change on health 11. To examine the relationship between environmental factors and human health outcomes. 12. To understand the various environmental health hazards and how they are assessed and managed. 13. To analyze the role of policies and regulations in mitigating environmental health risks.
Indicative Contents المحتويات الإرشادية	**Part I: Introduction** **4. Introduction to environmental health science** **5. Introduction to epidemiology** **6.** Toxicology and Environmental Health **Part II:** Routes of exposure to environmental risk factors **1-** Air pollution and respiratory health **2-** Water quality and waterborne diseases **3-** Soil contamination and exposure pathways **4-** Noise pollution and health effects **5-** Radiation exposure and health risks **Part III:** Climate Change and Health **Part IV:** Built Environment and Health **Part V:** Emerging Issues in Environmental Health

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	17. Method of lecturing 18. Student Center 19. Team Project 20. Work Shop 21. Scientific trips to monitor environmental pollution 22. Learning Technologies on Campus

	23. Experiential Learning 24. Application Learning

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	96	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**175**		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Environmental Health
Week 2	Environmental Epidemiology
Week 3	Toxicology and Environmental Health
Week 4	Routes of exposure to environmental risk factors
Week 5	Air pollution and respiratory health
Week 6	Noise pollution and health effects Radiation exposure and health risks
Week 7	Water quality and waterborne diseases Soil contamination and exposure pathways
Week 8	Examples of health risk factors: heavy metals, polycyclic aromatic hydrocarbons (PAHs), dioxins and furans (PCDD/Fs), polychlorinated biphenyls (PCBs) etc.
Week 9	Built Environment and Health
Week 10	Climate Change and Health
Week 11	Emerging Issues in Environmental Health
Week 12	Antimicrobial resistance and environmental factors
Week 13	Occupational health and safety
Week 14	Med exam
Week 15	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction & instrumentation in laboratory science
Week 2	Preparation of reagents from stock standard & converting between concentration units. storage of laboratory reagents
Week 3	Sample collection and handling)
Week 4	Ecosystem. The relationship between humans and the environment. Positive and scientific environmental practices.
Week 5	Noise, sound and radiation measuring instruments (outsaid)
Week 6	Water pollution
Week 7	Soil pollution
Week 8	Exam med
Week 9	Air pollution
Week 10	Measuring the toxicity of materials
Week 11	Classification of biological, physical, chemical, and environmental hazards within buildings. (assignment)
Week 12	preparation of final exam
Week 13	preparation of final exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Falta, D. A. (2022). *Maxwell's understanding environmental health: how we live in the world.* 3rd edition. Burlington, Jones & Bartlett Learning.	No
Recommended Texts		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	biostatistics			**Module Delivery**	
Module Type	**Core**			☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	EHS23013				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	2		**Semester of Delivery**	3	
Administering Department	environmental health science		**College**	Energy and Environmental Science	
Module Leader			**e-mail**	E-mail	
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor			**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 Objectives أهداف المادة الدراسية	1. Environmental Data Understanding: To equip students with an understanding of how to collect, analyze, and interpret environmental data using statistical methods. 2. Statistical Method Application: To apply statistical methods such as regression analysis, hypothesis testing, and probability distribution in the field of environmental science. 3. Software Utilization: To gain proficiency in the use of statistical software packages and programming languages (such as R, Python, or SPSS) for analyzing and interpreting environmental data. 4. Understanding of Environmental Trends: To develop skills to discern patterns, trends, and correlations in environmental data that can help in decision-making and policy formulation. 5. Ethical and Sustainable Approach: To instill a sense of ethical responsibility and sustainability when applying statistical methods to environmental science, acknowledging potential impacts on ecosystems and communities
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Data Interpretation Skills: Students will demonstrate the ability to collect, analyze, and interpret environmental data using appropriate statistical methods. 2. Proficiency in Statistical Methods: Students will show competence in applying various statistical methods to solve problems and answer research questions in environmental science. 3. Software Mastery: Students will exhibit proficiency in using statistical software and programming languages for data analysis in the field of environmental science. 4. Understanding of Environmental Patterns: Students will effectively identify and explain patterns, trends, and correlations in environmental data, demonstrating a clear understanding of their implications. 5. Sustainability Awareness: Students will showcase an understanding of ethical considerations and sustainability in statistical applications, incorporating these principles in their approach to environmental problem-solving.

Indicative Contents المحتويات الإرشادية	Part A - Introduction to Environmental Statistics • The Role of Statistics in Environmental Science (3 hrs): An overview of why statistics are important in environmental science, including examples of real-world applications. • Data Collection and Preprocessing (3 hrs): Techniques for gathering environmental data and preparing it for analysis, including data cleaning, outlier detection, and handling missing values. Part B - Basic Statistical Techniques • Descriptive Statistics and Data Visualization (3 hrs): How to summarize and visualize data using measures of central tendency, dispersion, and graphs/charts. • Probability and Distributions (3 hrs): Introduction to probability theory and the types of distributions commonly used in environmental science. • Hypothesis Testing and Confidence Intervals (3 hrs): Basics of hypothesis testing and calculating confidence intervals in the context of environmental data. Part C - Intermediate Statistical Techniques • Regression Analysis (3 hrs): How to perform and interpret simple and multiple regression analysis in environmental data. • Analysis of Variance (ANOVA) (3 hrs): Applying ANOVA for analyzing environmental data. • Introduction to Statistical Software (SPSS) (3 hrs): Hands-on introduction to statistical software SPSS for environmental data analysis.

	Part D - Advanced Statistical Techniques • Time Series Analysis (3 hrs): Applying time series analysis in environmental data, e.g., for studying trends in climate change. • Spatial Statistics (3 hrs): Analyzing spatial data, which is critical for many areas of environmental science. • Multivariate Analysis (3 hrs): Applying techniques like Principal Component Analysis (PCA) to reduce the dimensionality of environmental data. Part E - Case Studies and Ethics • Case Studies in Environmental Statistics (3 hrs): Reviewing real-world case studies to understand the practical applications of statistical methods in environmental science. • Ethics and Sustainability in Environmental Statistics (3 hrs): Discussing ethical and sustainability considerations in data collection and statistical analysis in environmental science.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The course "Statistical Applications " will employ various teaching strategies. These include traditional lectures for introducing key concepts, practical exercises, and software tutorials for hands-on learning of statistical tools. Group projects and case study analyses will enhance collaborative and critical thinking skills. Discussions and debates will engage students with ethical and sustainability considerations. Self-directed learning will be encouraged through readings and research projects. Regular assessments will monitor student progress and provide constructive feedback. Guest lectures from industry professionals will offer real-world insights.

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	21	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	0
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Environmental Statistics
Week 2	Data Collection and Preprocessing
Week 3	Descriptive Statistics and Data Visualization
Week 4	Probability and Distributions
Week 5	Hypothesis Testing and Confidence Intervals
Week 6	Review and Midterm Exam Preparation
Week 7	Midterm Exam
Week 8	Regression Analysis
Week 9	Analysis of Variance (ANOVA)
Week 10	Advanced Statistical Methods I
Week 11	Advanced Statistical Methods II
Week 12	Case Studies in Environmental Statistics
Week 13	Ethics and Sustainability in Environmental Statistics
Week 14	**Review and Preparation for Final Exam**
Week 15	**Review and Preparation for Final Exam**

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

Week 1	Lab 1: Introduction to Lab Environment
Week 2:	Lab 2: Data Collection Exercise
Week 3:	Lab 3: Data Cleaning and Visualization Lab with SPSS
Week 4:	Lab 4: Probability and Distribution Lab with SPSS
Week 8:	Lab 8: Regression Analysis Lab with SPSS
Week 9:	Lab 9: ANOVA Lab with SPSS
Week 10:	Lab 10: Advanced Functions in SPSS
Week 11:	Lab 11: Advanced Methods Lab I with SPSS
Week 12:	Lab 12: Advanced Methods Lab II with SPSS

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	Data Analysis in Management with SPSS Software 2013th Edition	Yes
Recommended Texts	Data Analysis with SPSS: A First Course in Applied Statistics 4th Edition	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	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
(0 – 49)	**F –** Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Microbiology**			**Module Delivery**	
Module Type	**Core**			☐ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	EHS23014				
ECTS Credits	6.00				
SWL (hr/sem)	**150**				
Module Level	2		**Semester of Delivery**	3	
Administering Department	Environmental health science		**College**	Energy and Environmental science	
Module Leader	Zahraa jaafar jameel		**e-mail**	Dr.zahraa.j@kus.edu	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Marwa khadhum		**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 Objectives أهداف المادة الدراسية	1. The definition of microbiology science 2. Types of microorganisms and bacterial infections. 3. To be able to isolate, diagnose, and identify the type of the bacteria. 4. To understand the construction of the bacteria. 5. The laboratory enforcement to culture the bacteria on different types of media. 6. To analysis the results obtained by the student compared with the standard results.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Recognition of Microbiology science. 2. Identify the types of bacteria, and how bacteria are classified. 3. Identify the most important bacterial disease and infections in human body. 4. Understand the immune response to bacterial infections. 5. Identify the different virulence factors used by bacteria to cause an infection.

	6. Understand the difference between prokaryotes and eukaryotes cell. 7. Recognize the structure of viruses. 8. Recognize the components of cell well, types of nutrition, and methods of transfer of genetic material 9. Identify the production of toxins, and the ways of antibiotics resistance.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Prokaryotes the components of prokaryotic cell, prokaryotic cells have a nucleoid region, DNA and RNA as their genetic material ribosomes that make proteins, and cytosol that contains a cytoskeleton that organizes cellular materials, and the difference between prokaryotes and eukaryotes. (15hr.) The function of each organelle, **Capsule,** found in some bacterial cells, this additional outer covering protects the cell when it is engulfed by other organisms. **Cell Wall,** an outer covering that protects the bacterial cell and gives it shape. Cytoplasm is a gel-like substance composed mainly of water that also contains enzymes, salts, cell components, and various organic molecules., cell membrane surrounds the cell's cytoplasm and regulates the flow of substances in and out of the cell. , flagella Hair-like structures on the surface of the cell that attach to other bacterial cells. Shorter pili called fimbriae help bacteria attach to surfaces. , **Flagella:** Flagella are long, whip-like protrusions that aid in cellular locomotion. **Ribosomes:** Ribosomes are cell structures responsible for protein production. **Plasmids:** Plasmids are gene-carrying, circular DNA structures that are not involved in reproduction. **Nucleoid Region:** Area of the cytoplasm that contains the single bacterial DNA molecule. prokaryotes divided into the Bacteria and Archaea (originally Eubacteria and Archaebacteria) because of the major differences in the structure and genetics between the two groups of organisms. Archaea were originally thought to be extremophiles, living only in inhospitable conditions such as extremes of temperature, pH, and radiation but have since been found in all types of habitats. The resulting arrangement of Eukaryota (also called

	"Eucarya"), Bacteria, and Archaea is called the three-domain system, replacing the traditional two-empire system. Part B – Prokaryotes Groups Bacteria , cell wall component , classification of bacteria according to difference in cell wall component into Gram positive and Gram negative using Gram stain method , nutrition method of bacteria , Genetic material transferring by conjugation or F plasmid , toxins production and types of toxins (endo and exotoxins) , bacteria resistance to antibiotics resistance mechanisms fall into four main categories 1) limiting uptake of a drug; (2) modifying a drug target; (3) inactivating a drug; (4) active drug efflux.

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

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem)	86	**Unstructured SWL (h/w)**	

الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Introduction to Microorganisms**
Week 2	**Organelles and its function**
Week 3	**Prokaryotes Group**

Week 4	**Introduction to Bacteria**
Week 5	**Cell Wall**
Week 6	**Bacterial growth curve**
Week 7	nutrition
Week 8	**Gene Transfer Between Bacteria**
Week 9	**GENETIC VARIATION**
Week 10	**Toxins**
Week 11	**Control of microorganisms**
Week 12	**the essential characteristics of viruses**
Week 13	**Replication of viruses**
Week 14	**Exam**
Week 15	**Seminar**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Lab Safety
Week 2	Lab2: sterilization process
Week 3	Lab3:TYPE OF MEDIA and PREPARATION OF CULTURE MEDIA
Week 4	Lab4:isolation of bacteria from soil
Week 5	Lab5:isolation of bacteria from water
Week 6	Lab6:isolation of bacteria from air

Week7	Lab 7: Smear Preparation and the Simple Stain
Week 8	Lab 8: Gram stain
Week 9	Lab 9: Determination of Bacterial Numbers
Week 10	Lab 10: The Effects of Chemical Agents on Bacteria: Antimicrobial Agents (Kirby-Bauer Method)
Week 11	Lab 11: Isolation of Escherichia coli Bacteriophages from Sewage and Determining Bacteriophage Titers
Week12	Lab 12: isolation of fungi 1
Week 13	Lab13:Phycomycetes, Ascomycetes, and Basidiomycetes
Week 14	Exam
Week 15	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts		Yes
Recommended Texts	Microbiology, Nina Parker, Shenandoah University, 2016. **Lippincott Illustrated Reviews: Microbiology** Edition: 4 (2019)	No
Websites	https://microbiologysociety.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

University Name: AlKarkh University of Science

College: Energy and Environmental Science

Dept: Environmental health Science

Module Information معلومات المادة الدراسية		
Module Title	Environmental Toxicology	**Module Delivery**
Module Type	**Core**	☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical**
Module Code	EHS23015	
ECTS Credits	6	

SWL (hr/sem)	150	☐ **Seminar**	
Module Level	**2**	**Semester of Delivery**	**3**
Administering Department	Environmental health science	**College**	Energy and Environmental Sciences
Module Leader	Dr. Khattab Al-Khafaji	**e-mail**	k.a.alkhafaji@gmai.com
Module Leader's Acad. Title	Assist Prof	**Module Leader's Qualification**	PhD
Module Tutor		**e-mail**	
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date		**Version Number**	

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	• Develop a solid foundation in the principles and concepts of environmental toxicology: • Provide students with a comprehensive understanding of the interdisciplinary nature of environmental toxicology, including its connections to ecology, chemistry, and public health. • Familiarize students with key toxicological principles, such as dose-response relationships, exposure assessment, and risk assessment. • Understand the sources, fate, and transport of environmental pollutants: • Explore the various sources of environmental pollutants, including industrial processes, agriculture, and urban activities.

	• Investigate the behavior of pollutants in the environment, including their movement through air, water, and soil, and their potential for bioaccumulation and biomagnification. • Analyze the effects of environmental pollutants on ecosystems and biodiversity: • Examine the impacts of toxicants on different levels of ecological organization, from individual organisms to populations and communities. • Investigate the mechanisms of toxicity, including the molecular and cellular responses to toxicants, and the ecological consequences of these effects. • Evaluate the human health implications of environmental pollutants: • Understand the pathways of human exposure to environmental toxicants, including occupational exposure, ingestion, and inhalation. • Examine the health effects associated with exposure to different classes of environmental pollutants, such as carcinogens, neurotoxicants, and endocrine disruptors.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• **Knowledge and Understanding:** • Demonstrate a comprehensive understanding of the principles and concepts of environmental toxicology, including the sources, fate, and transport of environmental pollutants. • Understand the mechanisms of toxicity and the effects of pollutants on ecosystems and human health. • Explain the principles and methodologies of risk assessment and risk management in environmental toxicology. • **Application of Toxicological Principles:** • Apply toxicological knowledge and skills to analyze and assess the potential risks and impacts of environmental pollutants on ecosystems and human populations. • Apply appropriate methods and techniques for the sampling, analysis, and detection of environmental toxicants. • Apply toxicological data and principles to develop strategies for the management and mitigation of environmental risks. • **Critical Thinking and Analysis:** • Critically evaluate scientific literature, research findings, and case studies in environmental toxicology. • Analyze and interpret toxicological data, including dose-response

	relationships, exposure assessments, and risk characterizations. • Synthesize and integrate information from multiple sources to evaluate and communicate the potential risks and impacts of environmental pollutants.
Indicative Contents المحتويات الإرشادية	**1. Introduction to Environmental Toxicology:** • Definition and scope of environmental toxicology • Historical development and importance of the field • Key concepts and principles in environmental toxicology **2. Toxicological Principles:** • Toxicity and dose-response relationships • Routes of exposure and absorption of toxicants • Factors influencing toxicity, such as age, sex, and genetics • Mechanisms of toxic action at the cellular and molecular levels **3. Environmental Pollutants:** • Classification and sources of environmental pollutants (e.g., heavy metals, pesticides, industrial chemicals, air pollutants) • Fate and transport of pollutants in the environment • Bioaccumulation and biomagnification processes **4. Ecotoxicology:** • Effects of pollutants on ecosystems and biodiversity • Assessment of ecological risks and impacts • Population and community-level effects of toxicants • Case studies on the effects of specific pollutants on ecosystems **5. Human Health Toxicology:** • Human exposure to environmental contaminants • Health effects of environmental pollutants (e.g., carcinogens, endocrine disruptors, neurotoxicants) • Risk assessment and risk management approaches • Regulatory frameworks for protecting human health **6. Analytical Techniques in Environmental Toxicology:** • Sampling and analysis of environmental samples for toxicants • Instrumental methods for detection and quantification • Biomarkers and bioassays for assessing exposure and effects **7. Toxicokinetics and Toxicodynamics:** • Absorption, distribution, metabolism, and excretion of toxicants in organisms • Molecular mechanisms of toxic action

	• Interactions between toxicants and biological targets • Individual and species sensitivity to toxicants **8. Environmental Toxicology and Policy:** • Environmental legislation and regulations • Risk communication and public perception of environmental risks • Ethical considerations in environmental toxicology research and decision-making • Application of toxicological data in environmental policy and management **9. Emerging Issues in Environmental Toxicology:** • Emerging contaminants and their potential risks (e.g., pharmaceuticals, nanomaterials, microplastics) • Climate change and its implications for toxicology • Ecotoxicological implications of emerging technologies **10. Toxicological Research and Case Studies:** • Critical evaluation of toxicological studies and research methodologies • Analysis of case studies and real-world examples in environmental toxicology • Design and implementation of toxicological studies **11. Risk Assessment and Management:** • Principles and methods of risk assessment • Development of risk management strategies • Integration of toxicological data into decision-making processes • Application of precautionary principles in environmental management **12. Environmental Toxicology and Public Health:** • Understanding the links between environmental toxicology and public health • Communicating toxicological information to the general public and stakeholders • Collaboration with public health agencies and professionals

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**Integration of Theory and Practical Application:** **Provide a balance between theoretical knowledge and practical application by incorporating laboratory experiments, fieldwork, case studies, and real-world examples.**

	Encourage students to apply theoretical concepts to solve environmental toxicology problems and analyze real-world scenarios. **Active Learning:** **Implement interactive teaching methods such as group discussions, debates, role plays, and problem-solving exercises.** **Engage students in hands-on activities, field trips, and practical assignments to foster active participation and critical thinking.** **Integration of Interdisciplinary Approaches:** **Emphasize the interdisciplinary nature of environmental toxicology by integrating knowledge from other fields, such as biology, chemistry, ecology, and public health.** **Encourage collaboration and team-based projects that involve students from different disciplines to address complex environmental toxicology issues.** **Use of Case Studies and Real-World Examples:** **Incorporate case studies and real-world examples that illustrate the application of environmental toxicology principles to address environmental challenges and inform decision-making.** **Encourage students to analyze and critically evaluate these case studies, considering the scientific, ethical, and societal dimensions of environmental toxicology.** **Incorporation of Technology:** **Utilize technology-based tools and resources such as computer simulations, modeling software, online databases, and multimedia presentations to enhance learning and understanding of complex toxicological processes and data analysis.** **Fieldwork and Site Visits:** **Organize fieldwork and site visits to relevant environmental settings, industrial sites, pollution control facilities, or regulatory agencies to provide students with firsthand exposure to environmental toxicology practices and challenges.** **Engage experts and professionals working in the field of environmental toxicology as guest speakers to share their experiences and insights.** **Critical Evaluation of Scientific Literature:** **Teach students how to critically evaluate scientific literature and research papers in environmental toxicology.** **Guide students in assessing the quality and validity of research studies, interpreting data, and identifying gaps in knowledge.** **Ethical Considerations and Responsible Conduct:**

	Incorporate discussions and activities that explore ethical considerations and responsible conduct in environmental toxicology research, including the responsible use of animals, data integrity, and transparency in reporting findings. Foster discussions on the ethical implications of toxicological research and its application to decision-making and policy development

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)**	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	86	**Unstructured SWL (h/w)**	
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)		
	Assignments	2	10% (10)		
	Projects	1	10% (10)		
	Report	1	10% (10)		
Summative assessment	**Midterm Exam**	2 hr	10% (10)		
	Final Exam	3hr	50% (50)		
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Introduction to Environmental Toxicology:**

Week 2	**Toxicological Principles:**
Week 3	**Environmental Pollutants:**
Week 4	**Ecotoxicology**
Week 5	**Human Health Toxicology:**
Week 6	**Analytical Techniques in Environmental Toxicology:**
Week 7	**Toxicokinetics and Toxicodynamics:**
Week 8	**Environmental Toxicology and Policy**
Week 9	**Emerging Issues in Environmental Toxicology:**
Week 10	**Toxicological Research and Case Studies:**
Week 11	**Risk Assessment and Management:**
Week 12	**Environmental Toxicology and Public Health:**
Week 13	**Seminars for Environmental Toxicology**
Week 14	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	"Introduction to Environmental Toxicology: Impacts of Chemicals Upon Ecological Systems" by W.G. Landis, Y. Yu, and M. Menzie "Fundamentals of Ecotoxicology: The Science of Pollution" by M. Newman "Environmental Toxicology: Biological and Health Effects of Pollutants" by D.J. Ecobichon	No
Recommended Texts	"Environmental Toxicology and Chemistry" by D. Hoffmann and B. Kosian	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
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية		
Module Title	Biochemistry	**Module Delivery**
Module Type	C	☒ **Theory** ☒ **Lecture**
Module Code	EHS23017	

ECTS Credits	6		☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
SWL (hr/sem)	150			
Module Level	**UGII**	**Semester of Delivery**	**THREE**	
Administering Department	ENVironmental health science	**College**	Energy and Environmental Sciences	
Module Leader	Dr. Khattab Adnan Abed	**e-mail**	k.a.alkhafaji@gmai.com	
Module Leader's Acad. Title	Lecturer Dr	**Module Leader's Qualification**	PhD	
Module Tutor		**e-mail**		
Peer Reviewer Name		**e-mail**		
Scientific Committee Approval Date		**Version Number**		

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	• Understand the fundamental principles of biochemistry: • • Introduce students to the basic concepts, theories, and principles of biochemistry. • Provide a solid foundation in the chemical structure, function, and metabolism of biological molecules. • Explore the application of biochemistry in environmental studies: •

	• Highlight the role of biochemistry in understanding environmental processes, such as nutrient cycling, pollutant degradation, and energy transfer. • Investigate the interactions between biological systems and the environment, including the impact of environmental stressors on biochemical pathways. • Investigate the biochemical basis of environmental issues: • • Examine the biochemical processes underlying environmental challenges, such as climate change, pollution, and ecosystem degradation. • Analyze the mechanisms of action and biochemical effects of environmental pollutants on living organisms. • Explore bioremediation and sustainable bioenergy: • • Introduce students to bioremediation strategies for the detoxification and restoration of polluted environments using biochemical processes. • Explore the principles and applications of bioenergy production from renewable sources, such as biomass and microbial fuel cells.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• Knowledge and Understanding: • Demonstrate a comprehensive understanding of the fundamental concepts, theories, and principles of biochemistry as they relate to environmental systems. • Explain the structure, function, and metabolism of biological molecules, including proteins, carbohydrates, lipids, and nucleic acids. • Describe the biochemical processes involved in nutrient cycling, energy transfer, and environmental adaptation. • Application of Biochemical Principles: • Apply biochemical knowledge and techniques to analyze and solve environmental problems, such as pollutant degradation, bioremediation, and sustainable bioenergy production. • Apply biochemical techniques, including protein purification, enzyme assays, and spectroscopy, to investigate and characterize environmental processes. • Critical Thinking and Analysis: • Evaluate and critically analyze scientific literature, research findings, and

	case studies related to biochemistry and environmental issues. • Interpret and analyze experimental data using biochemical principles and statistical analysis methods. • Identify the biochemical mechanisms underlying environmental challenges and propose innovative solutions and strategies based on scientific evidence.
Indicative Contents المحتويات الإرشادية	**13. Introduction to Biochemistry and Environmental Science** Overview of biochemistry and its relevance to environmental science Basic principles and concepts in biochemistry **14. Biomolecules and Environmental Interactions** Structure and function of proteins, carbohydrates, lipids, and nucleic acids Role of biomolecules in environmental processes and interactions **15. Metabolic Pathways and Energy Transfer** Overview of metabolic pathways involved in energy production and utilization Influence of environmental conditions on metabolic regulation **16. Enzymes and Environmental Catalysis** Enzyme structure, function, and catalytic mechanisms Enzymatic reactions and their importance in environmental processes Environmental factors affecting enzyme activity and stability **17. Biochemical Adaptations to Environmental Stress** Biochemical responses to environmental stressors (e.g., temperature, pH, pollutants) Biochemical indicators of environmental stress and health assessment **18. Environmental Toxicology and Detoxification** Introduction to environmental toxicology and its impact on ecosystems Metabolism and detoxification of environmental pollutants **19. Nutrient Cycling and Biogeochemical Processes** Biochemical aspects of carbon, nitrogen, and phosphorus cycles Impact of human activities on nutrient cycling and ecosystem functioning **20. Environmental Genomics and Proteomics**

	Application of genomics and proteomics in studying environmental systems Environmental applications of molecular biology techniques **21. Bioremediation and Environmental Biotechnology** Biotechnological approaches for environmental cleanup Applications of environmental biotechnology in pollution mitigation **22. Analytical Techniques in Environmental Biochemistry** Techniques for sampling, extraction, and analysis of environmental samples Spectroscopic, chromatographic, and mass spectrometry methods Data interpretation and analysis using statistical and bioinformatics tools **23. Environmental Ethics and Sustainable Practices** Sustainability principles and practices in biochemistry and environmental science Environmental policy and regulation related to biochemistry and environmental issues **Case Studies and Applications** Analysis of case studies showcasing the application of biochemistry in environmental science

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**Lectures**: Traditional lectures can be used to deliver foundational knowledge on conductive polymers, their properties, and applications. Lectures can also include discussions on historical developments and key concepts. **Case Studies**: Case studies can be used to explore real-world applications of conductive polymers. Students can analyze and discuss the challenges, opportunities, and outcomes of specific projects or industry collaborations, allowing them to gain insights into practical applications. **Group Discussions and Debates**: Group discussions encourage active participation and critical thinking. Students can engage in debates on topics such as the future of conductive polymers, ethical considerations, or emerging applications. This promotes collaborative learning and develops communication skills. **Problem-Based Learning**: Students can be presented with open-ended problems or scenarios related to conductive polymers. They can work in groups to analyze the

	problem, propose solutions, and present their findings. This fosters analytical thinking and problem-solving skills. **Research Projects**: Assigning research projects to students allows them to explore specific aspects of conductive polymers in depth. They can conduct literature reviews, design experiments, and analyze data, contributing to the advancement of knowledge in the field. **Online Resources and Virtual Tools**: Utilizing online resources, digital simulations, and virtual tools can enhance learning. These resources can provide interactive demonstrations, virtual experiments, and supplementary materials for self-paced learning. **Presentations and Poster Sessions**: Assigning presentations or poster sessions allows students to communicate their research findings or assigned topics effectively. This develops their presentation skills, promotes peer learning, and encourages critical evaluation of information. **Formative and Summative Assessments**: Regular formative assessments, such as quizzes or group projects, can help monitor students' progress. Summative assessments, such as examinations or research reports, evaluate students' understanding and mastery of the curriculum.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)**	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	86	**Unstructured SWL (h/w)**	
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)		
	Assignments	2	10% (10)		
	Projects	1	10% (10)		

	Report	1	10% (10)		
Summative assessment	**Midterm Exam**	2 hr	10% (10)		
	Final Exam	4hr	50% (50)		
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Introduction to Conductive Polymers** Overview of conductive polymers and their; significance in the energy sector; Conductive polymer properties and characteristics; Applications of conductive polymers in energy technologies; and Historical development and milestones in the field
Week 2	**Synthesis and Characterization of Conductive Polymers** Synthetic routes for conductive polymers Polymerization techniques and methods Characterization techniques for structural and electrical properties Analysis of polymer morphology and microstructure
Week 3	**Electrical Conductivity Mechanisms in Conductive Polymers** Theory of charge transport in polymers Intrinsic and extrinsic doping of polymers Influence of molecular structure on electrical conductivity Relationship between processing conditions and conductivity
Week 4	**Conductive Polymer Composites: Part1** Introduction to conductive polymer composites Types of conductive fillers and their dispersion in polymer matrices
Week 5	**Conductive Polymer Composites: Part 2** Influence of filler loading and distribution on electrical properties Processing techniques and challenges in composite fabrication
Week 6	**Energy Storage Applications: Part 1**

	Conductive polymer-based batteries Electrode materials and designs Electrochemical properties and performance metrics Strategies for enhancing energy density and cycling stability
Week 7	**Energy Storage Applications: Part 2** Conductive polymer-based supercapacitors Working principles and energy storage mechanisms Electrode materials and architectures Approaches to improving capacitance and power density
Week 8	**Energy Conversion Applications: Part 1** Conductive polymer-based solar cells Photovoltaic principles and device architectures Polymer donor and acceptor materials Techniques for improving efficiency and stability
Week 9	**Energy Conversion Applications: Part 2** Conductive polymer-based thermoelectric devices Thermoelectric principles and figure of merit Polymer selection for optimal thermoelectric performance Strategies to enhance thermoelectric efficiency
Week 10	**Emerging Applications and Future Trends** Conductive polymers in flexible and stretchable electronics Conductive polymers for energy-efficient lighting and displays Conductive polymers in sensors and actuators Overview of recent advances and ongoing research Future prospects and potential applications.
Week 11	**Seminars for students Applications of conductive polymers**
Week 12	**Manufacturing and Scale-up of Conductive Polymers** Scale-up considerations and challenges Manufacturing processes for conductive polymer-based devices

	Quality control and characterization techniques for large-scale production Economic and sustainability aspects of conductive polymer manufacturing.
Week 13	**Environmental Impact and Sustainability** Life cycle assessment of conductive polymers Environmental considerations in material selection and synthesis Recycling and disposal strategies for conductive polymers Eco-friendly alternatives and sustainable practices
Week 14	**Industry Engagement and Case Studies** Collaborations between academia and industry in conductive polymers Case studies highlighting successful applications and commercialization Industry perspectives on challenges and opportunities in the field Career paths and opportunities in the conductive polymer industry
Week 15	**Seminars for students on recent developments in conductive polymers**
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Biochemistry Lab Safety
Week 2	Lab 2: Carbohydrate (Molisch test)
Week 3	Lab 3: Benedict's Test
Week 4	Lab 4: Barfoed’s Test
Week 5	Lab 5: Bial’s Test
Week 6	Lab 6: Seliwanoff's test
Week 7	Lab 7: Iodine Test
Week 8	Lab 8: Lipids (Acrolein Test)

Week 9	Lab 9: Test of cupric acetate for detecting fatty acids
Week 10	Lab 10: Test for the Degree of Unsaturation of Fatty Acids (Iodine test)
Week 11	Lab 11: Detection of Cholesterol
Week 12	Qualitative tests of lipids
Week 10	Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Nelson, D.L., Cox, M.M., and Lehninger, A.L. (2017). Lehninger Principles of Biochemistry. 7th edition. W.H. Freeman and Company. Garrett, R., and Grisham, C.M. (2017). Biochemistry. 6th edition. Cengage Learning.	No
Recommended Texts	Lehninger, A.L., Nelson, D.L., and Cox, M.M. (2012). Lehninger Principles of Biochemistry. 6th edition. W.H. Freeman and Company.	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	community health			**Module Delivery**	
Module Type	**Core**			☐ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☒ **Practical** ☒ **Seminar**	
Module Code	EHS23018				
ECTS Credits	6.00				
SWL (hr/sem)	**150**				
Module Level	2		**Semester of Delivery**	3	
Administering Department	Environmental health science		**College**	Energy and Environmental science	
Module Leader	Zahraa jaafar jameel		**e-mail**	Dr.zahraa.j@kus.edu	

Module Leader's Acad. Title	Assistant Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor		**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date		**Version Number**	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	7. - To understand the key concepts and principles of community health. 8. - To analyze the social, economic, and environmental determinants of health. 9. - To explore the role of community health professionals in promoting health and preventing disease. 10. - To develop skills in community health needs assessment, program planning, and evaluation. 11. - To evaluate the impact of community health interventions on population health outcomes.
Module Learning Outcomes	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1- This course provides an overview of the principles and practices of community health. 2- It covers the social, economic, and environmental factors that affect the

مخرجات التعلم للمادة الدراسية	health of communities and explores strategies for promoting health and preventing disease at the community level. 3- Students will learn about the role of community health professionals, community health needs assessment, program planning, and evaluation. 4- The course includes lectures, case studies, and fieldwork to provide students with practical experience in community health
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A . Part B –

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

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	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	: Introduction to Community Health
Week 2	: Determinants of Community Health

Week 3	Community Health Assessment
Week 4	Community Health Program Planning and Implementation
Week 5	Designing and implementing community health interventions
Week 6	Evaluation of Community Health Programs
Week 7	Methods and tools for evaluating community health programs
Week 8	Health Promotion and Disease Prevention in Communities
Week 9	Role of community health campaigns and initiatives in promoting health
Week 10	Special Populations and Health Disparities
Week 11	Policy and Advocacy in Community Health
Week 12	Advances in technology and their application in community health
Week 13	Global health challenges and their impact on community health
Week 14	Future directions and opportunities in community health practice
Week 15	**Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Foundations for Community Health Workers" by Timothy Berthold	No
Recommended Texts	Community Health: A Population-Based Approach" by James W. Holsinger Jr.	No
Websites	https://microbiologysociety.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	**Climate Change**	**Module Delivery**
Module Type	**S**	☐ **Theory** ☒ **Lecture** ☐ **Lab**
Module Code	**CRE24019**	

ECTS Credits	**4**			☐ **Tutorial** ☐ **Practical** ☒ **Seminar**	
SWL (hr/sem)	**100**				
Module Level		2	**Semester of Delivery**		4
Administering Department		Environmental health science Dept.	**College**	College of ENERGY and environmental sciences	
Module Leader	Aqeel D. Salman		**e-mail**	aqeel.dawood@kus.edu.iq	
Module Leader's Acad. Title		Lecutrer	**Module Leader's Qualification**		Ph.D.
Module Tutor			**e-mail**		
Peer Reviewer Name			**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 Objectives أهداف المادة الدراسية	1. Definition of climate system 2. Explaining the coupling between climate systems 3. Definition the concept of feedback and its impact upon the climate 4. Explain the main climates classifications

	5. Identification of human-induced climate changes 6. Identify natural climate changes
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. To enable students to define climate systems 2. Learning the interactions between climate systems 3. Explain the concept of feedback and how can it work. 4. Define the Koppens classification of climate 5. Clarify the anthropogenic climate change 6. Learning the natural climate change and the main causes of it.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Climate systems: climate component, climate system coupling. Feedback, climate classifications Climate change: anthropogenic climate change, natural climate change. Mitigation, Adaptation

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

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	**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	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects/semn	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction – climate variables
Week 2	Climate system

Week 3	Climate system coupling (interaction)
Week 4	Climate response (feedback)
Week 5	Paleoclimate
Week 6	Climate classifications
Week 7	Human-induced climate change
Week 8	Aerosols importance
Week 9	Natural climate change
Week 10	Climate models and predictions
Week 11	mitigation and adaptation
Week 12	Paris Agreement

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Recommended Texts	Meteorology today: an introduction to meteorology	No

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	human physiology	**Module Delivery**	
Module Type	**Core**	☐ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	EHS24123		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	2	**Semester of Delivery**	4

Administering Department	Environmental health Science	**College**	Energy and Environmental Science
Module Leader		**e-mail**	
Module Leader's Acad. Title		**Module Leader's Qualification**	
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date		**Version Number**	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	EHS1207	**Semester**	2
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	The main aims of this module are to explore and gain knowledge of human physiology. Students will study the major systems of the human body, The main aims of this module are to explore and gain knowledge of human physiology. Students will study the major systems of the human body
Module Learning Outcomes	On successfully completing the module students will be able to: 1. Explain basic physiological principles. 2. Describe and explain the structure and function of the major systems of the body.

مخرجات التعلم للمادة الدراسية	3. Demonstrate an ability relate physiology of a macroscopic level to the histological microscopic level. 4. relate the structure of various cell types to their function Compare and contrast the role of a range of human physiological processes associated with homeostasis
Indicative Contents المحتويات الإرشادية	1. Structure and function of body systems Physiology of Endocrine system, Nervous system, Cardiovascular system, Respiratory system, Urinary system, Gastrointestinal, Immune system, Integumentary system, Skeletal system and Muscle Physiology 2. Homeostasis Understand the inter-relationship between systems in the maintenance of homeostasis. Recall key homeostatic systems throughout the bodily systems and how their disruption can lead to disease

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	25. Method of lecturing 26. Student Center 27. Team Project 28. Work Shop 29. Scientific trips to monitor environmental pollution 30. Learning Technologies on Campus 31. Experiential Learning 32. Application Learning

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**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	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Human Physiology
Week 2	Cell Physiology
Week 3	Nervous System
Week 4	Muscular System
Week 5	Cardiovascular System
Week 6	Respiratory System
Week 7	Digestive System
Week 8	Urinary System
Week 9	Endocrine System
Week 10	Reproductive System
Week 11	Sensory Systems
Week 12	Integumentary System
Week 13	Physiology of Aging
Week 14	Applied Human Physiology
Week 15	**Exam**
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Characteristics of good technician. How To avoid contamination of Specimen and Technician
Week 2	Lab 2: Specimen: Type, Collection, and Preparation (vein puncture & skin puncture)
Week 3	Lab 3: Blood separation to Cells, plasma, and serum, sample Hemolysis, Specimen rejection
Week 4	Lab 4: PCV and ESR
Week 5	Lab 5: Blood smear
Week 6	Lab 6: Complete Blood Counts: RBCs. Manual and Electronic Method
Week 7	Lab 7: Complete Blood Counts: WBCs. Manual and Electronic Method
Week 8	Lab 8: Hemoglobin: sahli & cyanmethemoglobin method
Week 9	Lab 9: Urine Sample: Importance, Method of Collection, Preparation, Transport and Storage Physical Examination of Urine Sample
Week 10	Lab 10 Chemical and physical Examination of Urine
Week 11	Lab 11 semen analysis: count, motility, viability & morphology
Week 12	Blood pressure
Week 10	Exam
Week 11	Clotting & types of anticoagulants
Week 12	Clotting time, bleeding time
Week 13	Blood group

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?

Required Texts	Fox, S. I. (2016). *Human physiology* (Fourteenth edition). McGraw-Hill Education.	No
Recommended Texts	Gyton, A. C., & Hall, J. E. Textbook of medical physiology, Pennsylvania.	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**	**Module Delivery**	
Module Type	**Core**	☐ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	EHS24024		
ECTS Credits	5		
SWL (hr/sem)	125		

Module Level	2	**Semester of Delivery**	4
Administering Department	Environmental health Science	**College**	Energy and Environmental Science
Module Leader	Dr. Alaa Badr Mohammed	**e-mail**	alaaalqaycy7@gmail.com
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 Objectives أهداف المادة الدراسية	1. Learn about the origin of soil formation and its evolution 2. Learn about the origin of water formation 3. Learn the properties of water 4. Identify the components of air 5. Identify the characteristics of water components 6. Learn about the most important interactions that take place in soil, water and air 7. Learn about cycles in the environment 8. Identify the interactions between the components of the environment, soil, water and air
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. To know the concepts of modern scientific differences. 2. To learn about the recent development of environmental chemistry. 3. To understand how environmental factors, affect a living organism 4. To understand how the environment affects it. 5. To recognize the mechanisms of cycles in nature 6. To distinguish between mental measurement and actual measurement 7. Doing practical experiments 8. Doing the lecture 9. Doing environmental activities 10. Spreading environmental awareness
Indicative Contents المحتويات الإرشادية	**7. Introduction to Chemistry** Introduction to periodic table Classification of elements **8. Simple Tool Skills** Unit Conversions Ideal Gas Law Stoichiometry **9. Bonding Models in Inorganic Chemistry** Basic of bonding which occurs to form the molecules and study its properties. **10. The Origin of Radiation** Electromagnetic radiation

	Wave Properties The particle nature of light Interaction of Radiation and Matter Lambert-Beer's law **11. Radioactivity** Stable and unstable nuclides Positron definition Half-life and mode of decay **12. Atmospheric Chemistry** Atmospheric Structure Ozone Catalytic Cycles **13. Greenhouse Gases** Sources of greenhouse effects Increasing GHG concentrations in the troposphere **14. CO_2 Equilibria** Pure Rain Polluted Rain Surface Water **15. Environmental Chemistry of Heavy Metals** Sample Collection Elemental Determinations • Atomic Absorption/Atomic Emission Spectrometry • Neutron Activation/Photon Activation Analysis **16. Environmental Chemistry of Nitrogen** Biogeochemical cycle of nitrogen Environmental biogeochemistry of nitrogen **17. Environmental Chemistry of Organotin** Toxicological Patterns of Organotins Analysis of Organotins at Environmental Levels Degradation of Organotin Compounds

	• U.V. Irradiation • Biological Cleavage • Chemical Cleavage **18. Fates of Organic Compounds** Vapor Pressure Water Solubility Partition Coefficients Lipophilicity Fish Partition Coefficients Adsorption Water–Air Transfer **19. Toxic Environmental Compounds** Pesticides Mercury Lead **20. Inorganic Deposits in Invertebrate Tissues** Metal Deposits Potassium, Magnesium, Calcium, Strontium, and Barium, Aluminium, Silicon, Vanadium, Chromium, Molybdenum, Manganese, Iron, Cobalt, Nickel, Copper, Zinc, Cadmium, and Mercury, Lead

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	33. Method of lecturing 34. Student Center 35. Team Project 36. Work Shop 37. Scientific trips to monitor environmental pollution 38. Learning Technologies on Campus 39. Experiential Learning 40. Application Learning

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**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	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Chemistry
Week 2	Simple Tool Skills
Week 3	Bonding Models in Inorganic Chemistry
Week 4	The Origin of Radiation
Week 5	Radioactivity
Week 6	Atmospheric Chemistry
Week 7	Mid-term Exam
Week 8	Greenhouse Gases
Week 9	CO_2 Equilibria
Week 10	Environmental Chemistry of Heavy Metals
Week 11	Environmental Chemistry of Nitrogen
Week 12	Environmental Chemistry of Organotin
Week 13	Fates of Organic Compounds
Week 14	Toxic Environmental Compounds
Week 15	Inorganic Deposits in Invertebrate Tissues
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Determination of dissolved oxygen in natural water by titration
Week 2	Lab 2: Measure of Alkalinity of water by titration
Week 3	Lab 3: Determination of chloride in water samples
Week 4	Lab 4: Determination of chlorine in water samples by titration
Week 5	Lab 5: Determination of hardness of water
Week 6	Lab 6: Determination of sulfate in water
Week 7	Lab 7: pH of soil
Week 8	Lab 8: Find out the total dissolved solid in the given water sample
Week 9	Lab 9: Biochemical oxygen demand (BOD)
Week 10	Lab 10: Determination dissolved carbon dioxide in water sample

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	H. J. M. Bowen, Environmental Chemistry Volume 3, 1984 The Royal Society of Chemistry	No
Recommended Texts	Ronald A. Hites, Elements of Environmental Chemistry, 2007, Wiley; 1st edition	No
Websites		

Grading Scheme

مخطط الدرجات

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

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Environmental Pollution	**Module Delivery**	
Module Type	**Core**	☐ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code	EHS24025		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	2	**Semester of Delivery**	4

Administering Department	Environmental health Science	**College**	Energy and Environmental Science
Module Leader		**e-mail**	
Module Leader's Acad. Title		**Module Leader's Qualification**	
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date		**Version Number**	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	9. Learn about the environmental pollution 10. Learn about the principles of environmental pollution 11. Learn the types of environmental pollution 12. Identify the types of environmental pollution 13. Learn about the environmental pollution solvents 14. Learn about biological interaction with environmental chemicals Learn about protecting water, food, and air

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	11. To know the concepts of environmental pollution. 12. To learn about the principles of environmental pollution. 13. To understand how environmental factors, affect a living organism 14. To recognize the pollutants reactions. 15. To distinguish between types of environmental pollution.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Atmospheric pollution and climate change Atmospheric pollution control (law and regulation) Noise pollution and control, Water pollution etc.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	41. Method of lecturing 42. Student Center 43. Team Project 44. Work Shop 45. Scientific trips to monitor environmental pollution 46. Learning Technologies on Campus 47. Experiential Learning 48. Application Learning

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

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

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction (define the terms; types of pollution)
Week 2	Atmospheric pollution and climate change
Week 3	Atmospheric pollution control (law and regulation)
Week 4	Noise pollution and control
Week 5	Water pollution
Week 6	Water treatment
Week 7	Deteriorating impacts of emerging water pollutants on biological diversity
Week 8	Thermal and oil pollution
Week 9	Soil pollution
Week 10	Radiation pollution
Week 11	Environmental impact assessment
Week 12	Alternative fules- bio energy crops
Week 13	Seminar
Week 14	exam
Week 15	**Preparatory week before the final Exam**
Week 16	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Peirce, J. J., Vesilind, P. A., & Weiner, R. (1998). Environmental pollution and control. Butterworth-Heinemann.	No
Recommended Texts		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	immunology	**Module Delivery**	
Module Type	**Core**	☐ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code	EHS24026		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	2	**Semester of Delivery**	4
Administering Department	Environmental health Science	**College**	Energy and Environmental Science
Module Leader		**e-mail**	
Module Leader's Acad. Title		**Module Leader's Qualification**	
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date		**Version Number**	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	• Understand the basic concepts and principles of the immune system. • Describe the structure and function of immune cells and organs. • Explain the mechanisms of innate and adaptive immunity. • Analyze the processes of antigen recognition, processing, and presentation. • Discuss the immune response to pathogens and vaccines. • Identify the causes and effects of immunological disorders. • Apply immunological knowledge to solve problems in health and disease.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	This course provides an in-depth understanding of the immune system and its role in health and disease. It covers the cellular and molecular mechanisms of the immune response, the development and function of the immune system, and the various aspects of immunological disorders. Through lectures, discussions, and practical sessions, students will gain a comprehensive understanding of immunology and its applications in research and clinical settings.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Cells and Organs of the Immune System, Innate Immunity, Adaptive Immunity, Antigen Recognition and Presentation, Immune Response to Pathogens, Immunological Tolerance and Autoimmunity, Tumor Immunology…..etc.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	49. Method of lecturing 50. Student Center 51. Team Project 52. Work Shop 53. Scientific trips to monitor environmental pollution 54. Learning Technologies on Campus 55. Experiential Learning 56. Application Learning

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	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

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

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Immunology
Week 2	Cells and Organs of the Immune System
Week 3	Innate Immunity
Week 4	Adaptive Immunity
Week 5	Adaptive Immunity
Week 6	Antigen Recognition and Presentation
Week 7	Immune Response to Pathogens
Week 8	Immunological Tolerance and Autoimmunity
Week 9	Hypersensitivity and Allergies
Week 10	Hypersensitivity and Allergies
Week 11	Immunodeficiency Disorders
Week 12	Transplantation Immunology
Week 13	Tumor Immunology
Week 14	Seminar
Week 15	**Exam2**
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab safety
Week 2	Cells of the immune system
Week 3	Organs and Tissues of the Immune System
Week 4	Routs of antigen administration and bleeding of laboratory animals
Week 5	Bleeding in mice
Week 6	Antige -Antibody Interaction
Week 7	ABO &Rh Systems
Week 8	RF :Rheumatoid Factor
Week 9	Widal test
Week 10	Rose Bengal Test
Week 11	Antistreptolysin O Titer
Week 12	Pregnancy test
Week 10	ELISA Immunosorbent Assay
Week 11	Types of ELISA
Week 12	Exam
Week 13	

Learning and Teaching Resources

مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Peirce, J. J., Vesilind, P. A., & Weiner, R. (1998). Environmental pollution and control. Butterworth-Heinemann.	No
Recommended Texts		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	radiation and human health	**Module Delivery**	
Module Type	C	☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code	EHS35027		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	3	**Semester of Delivery**	5
Administering Department	Environmental health science	**College**	Energy and Environmental science
Module Leader	Assistant Prof. Dr. zahraa jaafar Jameel	**e-mail**	E-mail: dr.zahraa.j@kus.edu
Module Leader's Acad. Title	Assistant Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor		**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date		**Version Number**	

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. - To understand the basic principles of radiation physics and the different types of radiation. 2. - To explore the mechanisms of radiation interaction with biological systems. 3. - To assess the health effects of radiation exposure on different organs and systems. 4. - To learn about radiation protection standards and practices. 5. - To evaluate the applications of radiation in medicine and other fields.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. - Student Learning Outcome: 2. By the end of the course, the students are being able to: 3. 1- Develop advanced academic knowledge about the concepts and principles of radiation and human health 4. 2- Cover the importance of radiation and human health and the history background of this subject. 5. Detail knowledge about the radiation and human health and its applications 6. Having knowledge about the up-to-date advancing and development in this field of subject 7. They could be familiar with the modest instruments in the medical labs like PCR and other technique
Indicative Contents المحتويات الإرشادية	Emotional and value goals 1- Enable students to cooperate with each other in solving practical assignments. 2 - Enabling students to focus on the topic of the lesson and harmony and interaction with it. 3 - Enabling students to organize the information and data they receive during the lesson. 4- Enabling the students to recreate their way of thinking towards living beings and appreciating the greatness of the Almighty Creator

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

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Radiation and Human Health
Week 2	Overview of radiation protection and safety
Week 3	Radiation Physics and Measurement
Week 4	Radiation detection and measurement techniques
Week 5	Biological Effects of Radiation
Week 6	Health Effects of Radiation Exposure

Week 7	Health Effects of Radiation Exposure
Week 8	Radiation Protection and Safety
Week 9	**Medical Applications of Radiation**
Week 10	Radiation risks and benefits in medical procedures
Week 11	Non-Medical Applications of Radiation
Week 12	Radiation Risk Assessment and Communication
Week 13	Advances and Emerging Issues in Radiation and Health
Week 14	Med exam
Week 15	preparation
Week 16	Examination

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts		
Recommended Texts	- "Radiation Protection in Medical Radiography" by Mary Alice Statkiewicz Sherer, Paula J. Visconti, and E. Russell Ritenour - "Essentials of Radiation, Biology, and Protection" by Steve Forshier	

Websites	- [National Council on Radiation Protection and Measurements (NCRP)](https://ncrponline.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	Occupational Health and Safety	**Module Delivery**

Module Type	**Core**		☒ **Lecture** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	EHS35028			
ECTS Credits				
SWL (hr/sem)	**100**			
Module Level	3	**Semester of Delivery**	5	
Administering Department	Environmental health science	**College**	Energy and Environmental science	
Module Leader	Assistant Prof. Dr. zahraa jaafar Jameel	**e-mail**	E-mail: dr.zahraa.j@kus.edu	
Module Leader's Acad. Title	Assistant Professor	**Module Leader's Qualification**	Ph.D.	
Module Tutor		**e-mail**	E-mail	
Peer Reviewer Name	Name	**e-mail**	E-mail	
Scientific Committee Approval Date		**Version Number**		

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives	

أهداف المادة الدراسية	6. To understand the basic principles of occupational health and safety. 7. To provide the student with the basic knowledge of occupational health and safety 8. To study the main characteristics of hazards. 9. To teach aseptic practice. 10. To provide an understanding of occupational health and safety
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 8. - Student Learning Outcome: 9. By the end of the course, the students are being able to: 10. 1- Develop advanced academic knowledge about the concepts and principles of molecular biology. 11. 2- Cover the importance of occupational health and safety and the history background of this subject. 12. Detail knowledge about occupational health and safety and its applications 13. Having knowledge about the up-to-date advancing and development in this field of subject
Indicative Contents المحتويات الإرشادية	Emotional and value goals 1- Enable students to cooperate with each other in solving practical assignments. 2 - Enabling students to focus on the topic of the lesson and harmony and interaction with it. 3 - Enabling students to organize the information and data they receive during the lesson. 4- Enabling the students to recreate their way of thinking towards living beings and appreciating the greatness of the Almighty Creator

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation

تقييم المادة الدراسية

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

	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	General EHS guidlines
Week 2	Environmental factors impact personal health
Week 3	EHS plan
Week 4	Elements of the work environment
Week 5	Classification of occupational health and safety hazards
Week 6	Chemical hazards
Week 7	Biological hazards
Week 8	Toxicology
Week 9	Types of organ specific toxic effect
Week 10	Evaluation of occupational health and safety hazards
Week 11	Hierarchy of prevention and control methods
Week 12	Evaluate the level of noise in occupational setting
Week 13	Evaluate the hazards in occupational setting
Week 14	Seminar

Week 15	Mid exam
Week 16	Examination

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts		
Recommended Texts		
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	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded

(0 – 49)	**F –** Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Molecular Biology			**Module Delivery**	
Module Type	**Core**			☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	EHS35029				
ECTS Credits	7				
SWL (hr/sem)	**175**				
Module Level		3	**Semester of Delivery**		5
Administering Department		Environmental health science	**College**	Energy and Environmental science	
Module Leader	Assistant Prof. Dr. zahraa jaafar Jameel		**e-mail**	E-mail: dr.zahraa.j@kus.edu	
Module Leader's Acad. Title		Assistant Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor			**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	

Scientific Committee Approval Date		**Version Number**	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	11. To understand the basic principles of molecular biology. 12. To provide the student with the basic knowledge of molecular genetics of eukaryotic and prokaryotic in general 13. To study the main characteristics of DNA importance and their identification. 14. To teach aseptic techniques. 15. To provide an understanding of central dogma
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 14. - Student Learning Outcome: 15. By the end of the course, the students are being able to: 16. 1- Develop advanced academic knowledge about the concepts and principles of molecular biology. 17. 2- Cover the importance of molecular biology and the history background of

	this subject. 18. Detail knowledge about the molecular biology and its applications 19. Having knowledge about the up-to-date advancing and development in this field of subject 20. They could be familiar with the modest instruments in the medical labs like PCR and other technique
Indicative Contents المحتويات الإرشادية	Emotional and value goals 1- Enable students to cooperate with each other in solving practical assignments. 2 - Enabling students to focus on the topic of the lesson and harmony and interaction with it. 3 - Enabling students to organize the information and data they receive during the lesson. 4- Enabling the students to recreate their way of thinking towards living beings and appreciating the greatness of the Almighty Creator

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

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	111	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**175**		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction in molecular Biology – Structure of Protein –Nucleic acid
Week 2	DNA Conformations - Types of DNA
Week 3	DNA as a Carrier of Genetic Information
Week 4	Physical Properties of the DNA
Week 5	Prokaryotic chromosome structure - Chromatin Structure
Week 6	Types of RNA
Week 7	DNA Replication of Prokaryotic Cells
Week 8	DNA Replication of eukaryotic Cells
Week 9	Prokaryotic Transcription
Week 10	Eukaryotic Transcription
Week 11	Translation Process -Mechanism of Protein Synthesis

Week 12	Regulation of transcription in prokaryotes
Week 13	Eukaryotic Gene Regulation
Week 14	Genetic Engineering
Week 15	Gene cloning - Genomics - Metagenomics
Week 16	Examination

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	**equipment's & materials commonly used in a laboratory**
Week 2	Methods For Preparation Of Solutions And Structured Used In Molecular Biology Experiments
Week 3	DNA Extraction Methods
Week 4	Preparation of Genomic DNA From Prokaryotic
Week 5	Preparation of Plasmid DNA From Bacteria

Week 6	DNA Preparation From Eukaryotes
Week 7	Determination of DNA& RAN purity and concentration
Week 8	Examination
Week 9	Determination of the number of G + C % ratio and melting point
Week 10	Gel electrophoresis
Wee;11	Electrolysis of polyacrylamide gel electrophoresis (PAGE)
Week12	Determination of RAN purity and concentration
Week13	Polymerase chain reaction
Week14	Methods of extracting proteins Protein Extraction
Week15	Examination

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Instant NotesIn Molecular Biology. (2005) Third Edition Phil Turner, Alexander McLennan, Andy Bates & Mike	Yes

	White School of Biological Sciences, University of Liverpool, Liverpool, UK Essentials of Molecular Biology. (2013). V. Malathi .Department of Biochemistry Ethiraj College for Women Chennai	
Recommended Texts	From Genes to Genomes. (2012) Third Edition . Jeremy W. Dale, Malcolm von Schantz and Nick Plant *University of Surrey, UK*	Yes
Websites	http://www.wiley.com/go/dale/genes3e	

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 مادة تشريعات وقوانين صحة بيئية

Module Information معلومات المادة الدراسية			
Module Title	environmental health legislations		**Module Delivery**
Module Type	C		☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☒ Seminar
Module Code	EHS35030		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	4	**Semester of Delivery**	7
Administering Department	Environmental health Science	**College**	College of Energy and Environmental Science
Module Leader	MunaTaha	**e-mail**	munataha65@kus.edu.iq
Module Leader's Acad. Title	Assistant lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor	/	**e-mail**	/
Peer Reviewer Name	none	**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 Objectives أهداف المادة الدراسية	This course provides an overview of the laws and regulations that govern environmental health. It explores the historical development of environmental health legislation, the roles of governmental and non-governmental organizations, and the impact of legal frameworks on public health and the environment. Students will analyze key environmental health laws, examine case studies, and explore the challenges and opportunities in implementing and enforcing these laws.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	To understand the key concepts and principles of environmental health legislation. - To explore the historical development and evolution of environmental health laws. - To examine the roles and responsibilities of various stakeholders in environmental health governance. - To analyze the impact of environmental health laws on public health and the environment. - To evaluate the challenges and opportunities in implementing and enforcing environmental health legislation.
Indicative Contents المحتويات الإرشادية	1- مفهوم البيئة التلوث تعريف البيئة في الاصطلاح العلمي هي : ذلك الحيز الذي يمارس فيه البشر مختلف أنشطة حياتهم، وتشمل ضمن هذا الإطار كافة الكائنات الحية من حيوان ، ونبات ،والتي يتعايش معها الإنسان ، فالبيئة تشمل كل ما يحيط بالإنسان من ماء وهواء وأرض فهو يؤثر فيها ويتأثر بها. 2- أبعاد مشكلة التلوث

لقد بات مستقبل الحياة على كوكب الأر ض مهدداً بأخطار جسيمة بسبب سوء ت صرف الإنسان واعتداءاته العمدية و غير العمدية المتزايدة على البيئة المحيطة والتي تشبع له حاجاته ، بل وهي قوام حياته ، وبدأت البيئة بالفعل – رغم نظامها البديع وإمكانياتها الكبيرة – تنوء بما أصابها من جراء ذلك من تلوث وتعجز عن معالجته تلقائياً بما يحقق خير الناس .

3- أنواع التلوث ذات الاهتمام الدولي:

أ-النوع الأول : هو الذي يطلق عليه اسم "التلوث عبر الحدود" وهذا النوع يكون مصدر التلوث في إحدى الدول التي ينتج عنه أضرار تعبر حدود دولة المصدر إلى إقليم دولة أخرى.

ب-النوع الثاني : من التلوث الذي يثير الاهتمام الدولي فهو الذي يضر بالمناطق المعروفة باسم "المال العام".

ج-النوع الثالث : من التلوث الذي يلقي عناية واهتمام دوليين هو ما يطلق عليه التلوث الضار "بالتراث الثقافي والطبي العالمي"

د-النوع الرابع : هو عبارة عن تلوث محلي أو داخلي: وهو تلوث يكون مصدره وأثاره الضارة داخل نفس الإقليم.

4- وسائل الحماية من التلوث تستلزم حماية البيئة في أي مكان القيام بعدة مهام أساسية لا غنى عنها جميعا لتحقيق الهدف المنشود.

5--تعريف المنظمات الدولية:

يمكن تعريف المنظمة الدولية: بأنها شخص معنوي من أشخاص القانون الدولي العام ،ينشأ من اتحاد ارادات مجموعة من الدول لرعاية مصالح مشتركة دائمة بينها، ويتمتع بإرادة ذاتية في المجتمع الدولي وفي مواجهة الدول الأعضاء .

6-العناصر الأربعة الرئيسية لنشأة المنظمة الدولية ،والتي يجب توافرها لتكون متمتعة بالشخصية القانونية الدولية ،وهي كما يلي :

أ- الديمومة أو الاستمرار.

ب- الإرادة الذاتية أو الشخصية المستقلة.

ج- الصفة الدولية .

د- الصفة الاتفاقية.

7- تصنيف المنظمات قد اختلفت بحسب زاوية النظر إلى المنظمة وسوف نقصر عرضنا على تصنيفات ثلاث فحسب، الأول منها يقسمها من حيث نطاق العضوية ،والثاني ينظر إليها من حيث نوع السلطات ،ويقسمها الأخير وفقا للطبيعة الموضوعية للمنظمة.

8-القانون البيئي أو قانون الموارد البيئية والطبيعية: هو مصطلح جماعي يصف مجموعة المعاهدات والنظم الأساسية والأنظمة والقوانين العامة والعرفية التي تعالج آثار النشاط البشري على البيئة الطبيعية

9-المواضيع التي يهتم بها القانون البيئي في منع تلوث المياه البحرية وتوفير الحماية والاستخدام المعقول للثروات والأحياء البحرية وحماية الغلاف الجوي من التلوث وحماية النباتات والغابات والحيوانات البرية وحماية المخلوقات الفريدة

10- قانون مكافحة التلوث

جودة الهواءتحكم قوانين جودة الهواء بمستويات انبعاثات تلوث الهواء الناجم عن دخان المصانع

تحكم قوانين جودة الهواء انبعاث ملوثات الهواء في الغلاف الجوي، إذ توجد مجموعة فرعية متخصصة من قوانين جودة الهواء التي تضبط جودة الهواء الداخلي للمباني. غالبًا ما تُصمم قوانين ضبط جودة الهواء خصيصًا لحماية صحة الإنسان عن طريق الحد من تراكيز الملوثات المحمولة في الجو أو القضاء عليها.

11.جودة المياه

تخضع أنابيب تصريف مياه الأمطار وما يشابها إلى قوانين جودة المياه.

12 - إدارة المخلفات

تخضع مكبات النفايات قي العديد من البلدان إلى قوانين إدارة المخلفات

13.- تنظيف الملوثات

تحكم قوانين التنظيف البيئي عمليات إزالة الملوثات كإدارة وتدارك البقع والتسربات النفطية تنظم قوانين التنظيف البيئي إزالة التلوث أو الملوثات من الأوساط البيئية مثل التربة أو المواد المترسبة أو المياه السطحية أو المياه الجوفية. وعلى عكس قوانين مكافحة التلوث، فإن قوانين التنظيف مُصممة للاستجابة بعد حدوث التلوث البيئي، وبالتالي يجب على هذه القوانين في كثير من الأحيان أن تحدد ليس فقط إجراءات الاستجابة الضرورية، ولكن الأطراف التي قد تكون مسؤولة عن التصرف (أو دفع ثمن) مثل هذه الأفعال.

14- استدامة الموارد

تقييم الأثر البيئي (EIA)، وهو تقييم العواقب البيئية (الإيجابية والسلبية) لخطة أو سياسة أو برنامج أو مشروع فعلي، قبل اتخاذ قرار بالمضي قُدُمًا في الإجراء المُقترح.

15- التطور التاريخي للاهتمام بالقانون الدولي المؤتمرات والاتفاقيات الدولية

•لقد تم عقد الكثير من المؤتمرات الدولية المعنية بحماية البيئة

1مؤتمر استكهولم في السويد عام 1972

2مؤتمر هلنسكي للأمن والتعاون الاوربي عام 1975

3- مؤتمر نيروبي عام 1982

4 - مؤتمر ريودي جانيرو عام 199

16- حماية البيئة في العراق

أن الدستور العراقي الصادر عام 2005 يعتبر من الدساتير العربية النادرة التي اهتمت بالحق في البيئة وضرورة المحافظة عليه •. لقد نصت المادة) 33 (الفقرة الاولى منه) لكل فرد حق العيش في ظروف بيئية سليمة.) •اما الفقرة الثانية من نفس المادة فنصت على ان) تكفل الدولة حماية البيئة والتنوع الأحيائي والحفاظ عليها .

	17 - التشريعات البيئية في العراق 1- قانون التشجير رقم 43 لسنة 1943 2- قانون تنظيم ذبح الحيوانات رقم 22لسنة 1948 3-قانون المراعي الطبيعية رقم 2لسنة 1983 4-قانون الغابات والمشاجر رقم (30)لسنة 2009 5-قانون حماية الحيوانات والطيور البرية رقم 21 لسنة 1979

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Lecture Discussion Practical Experience Clarification and Ask Questions reflect on what you have learned Research and reports

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem)	52	**Unstructured SWL (h/w)**	

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

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	5% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	5% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects	1	15% (10)	Continuous	All
	Report	1	5% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	60% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Environmental Health Legislation
Week 2	Historical Development of Environmental Health Legislation
Week 3	Legal Frameworks and Regulatory Bodies

Week 4	Key Environmental Health Laws and Regulations
Week 5	Key Environmental Health Laws and Regulations
Week 6	International Environmental Health Laws and Agreements
Week 7	Environmental Health Law Enforcement and Compliance
Week 8	: Environmental Health Policy and Advocacy
Week 9	: Environmental Health Policy and Advocacy
Week 10	Challenges in balancing economic development and environmental protection
Week 11	Local law
Week 12	Protection of environment in Iraq
Week 13	seminar
Week 14	Med exam
Week 15	Review and Final Assessment
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	التلوث البيئي في قوانين حماية البيئة العربية/ د. علي الفيلي 2013	No
Recommended Texts	حماية البيئة والتراث الثقافي في القانون الدولي دور المنظمات الدولية في حماية البيئة/ 2008 عبد الناصر زياد، القانون البيئي : النظرية العامة للقانون البيئي مع شرح التشريعات البيئية، دار الثقافة والنشر والتوزيع،2014	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	Pathology	**Module Delivery**

Module Type	**C**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	EHS35031				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	3		**Semester of Delivery**	5	
Administering Department	Environmental Health Science	**College**	Energy and Environmental Science		
Module Leader	Aqeel M. Ali		**e-mail**		
Module Leader's Acad. Title	Assistant prof.		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Sarah Raad Mohammed		**e-mail**	sarah.raad@kus.edu.iq	
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 Objectives	The purpose of this course is for the students to:

أهداف المادة الدراسية	18. Demonstrate an understanding of basic principles of pathology as it relates to the clinical practice 19. Discuss the terminology, histopathology, etiology and steps to diagnose wide variety of diseases described in the course 20. provide students with essential medical knowledge and a broad understanding of human disease 21. Describe the human defense mechanism, inflammation process and wound healing. 22. Describe and recognize the major cell and tissue alterations associated with these diseases and how they contribute to organ dysfunction or clinical signs and symptoms.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	7. discuss concepts of cell injury, adaptation, inflammation, repair 8. **Recognize** the difference between necrosis and apoptosis, acute and chronic inflammation, 9. **Diagnose** some granulomatous diseases as tuberculosis and sarcoidosis 10. **Describe** the morphology of common pathological processes as necrosis, apoptosis 11. Student will be able to : describe and classify the diseases cost by environmental hazards
Indicative Contents المحتويات الإرشادية	1- Enable students to cooperate with each other in solving practical assignments. 2 - Enabling students to focus on the topic of the lesson and harmony and interaction with it. 3 - Enabling students to organize the information and data they receive during the lesson. 4- Enabling the students to recreate their way of thinking towards living beings and appreciating the greatness of the Almighty Creator

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	57. Method of lecturing 58. Student Center 59. Team Project 60. Work Shop 61. Scientific trips to monitor environmental pollution 62. Learning Technologies on Campus

	63. Experiential Learning 64. Application Learning

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	**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	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to pathology
Week 2	**Cell injury, REVERSIBLE IRREVERSIBLE**
Week 3	**cell death**
Week 4	**Cell adaptation to stress**
Week 5	**Intra & Extracellular Depositions & Cell Aging**
Week 6	**Inflammation**
Week 7	Exam 1
Week 8	**Suppurative Inflammation**
Week 9	**Chronic inflammation**
Week 10	**Granulomatous inflammation**
Week 11	**Amyloidosis**
Week 12	**Repair**
Week 13	**Environmental and Nutritional Diseases**
Week 14	Systemic pathology (e.g., heart, respiratory, gastrointestinal, breast, skin)
Week 15	Exam 2

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Mohan, Harsh. *Textbook of pathology*. Jaypee Brothers Medical Publishers, 2018	No
Recommended Texts	Hoda, Syed A., and Raza S. Hoda. "Robbins and cotran pathologic basis of disease." (2020): 869-869.	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 analysis			**Module Delivery**	
Module Type	C			☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	EHS35032				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	3		**Semester of Delivery**	5	
Administering Department	Environmental health science		**College**	Energy and Environmental science	
Module Leader	Assistant Prof. Dr. zahraa jaafar jameel		**e-mail**	E-mail: dr.zahraa.j@kus.edu	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**		

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	16. To understand the key concepts and principles of environmental analysis. 17. - To learn about various environmental pollutants and their sources. 18. - To acquire skills in sampling, analytical techniques, and data interpretation. 19. - To analyze the impact of pollutants on ecosystems and human health. 20. - To explore current issues and advancements in environmental analysis.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 21. - Student Learning Outcome: 22. By the end of the course, the students are being able to: 23. 1- Develop advanced academic knowledge about the concepts and principles of environmental analysis 24. 2- Cover the importance of environmental analysis and the history background of this subject. 25. Detail knowledge about the environmental analysis and its applications 26. Having knowledge about the up-to-date advancing and development in this field of subject 27. They could be familiar with the modest instruments in the medical labs like PCR and other technique
Indicative Contents المحتويات الإرشادية	Emotional and value goals 1- Enable students to cooperate with each other in solving practical assignments. 2 - Enabling students to focus on the topic of the lesson and harmony and interaction with it. 3 - Enabling students to organize the information and data they receive during the lesson.

	4- Enabling the students to recreate their way of thinking towards living beings and appreciating the greatness of the Almighty Creator

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

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	86	**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	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Overview of environmental analysis and its importance
Week 2	Types of environmental pollutants and their sources
Week 3	Regulatory standards and guidelines for environmental analysis
Week 4	Principles of sampling in environmental analysis
Week 5	Types of samples: air, water, soil, and biological samples
Week 6	Sampling strategies and planning
Week 7	Overview of analytical techniques and instrumentation

Week 8	Chromatographic methods: GC, HPLC, and ion chromatography
Week 9	Microscopic techniques: optical and electron microscopy
Week 10	Analysis of Biological Samples
Week 11	Analysis of Soil and Sediment Pollutants
Week 12	Emerging Issues and Advanced Topics in Environmental Analysis
Week 13	Emerging Issues and Advanced Topics in Environmental Analysis2
Week 14	Med exam
Week 15	preparation
Week 16	Examination

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	**equipment's & materials commonly used in a laboratory**
Week 2	Types of environmental pollutants and their sources
Week 3	Regulatory standards and guidelines for environmental analysis
Week 4	Principles of sampling in environmental analysis
Week 5	Quality assurance and quality control in sampling

Week 6	Overview of analytical techniques and instrumentation
Week 7	Spectroscopic methods: UV-Vis, IR, and atomic absorption spectroscopy
Week 8	Chromatographic methods: GC, HPLC, and ion chromatography
Week 9	Microscopic techniques: optical and electron microscopy
Week 10	Analysis of Air Pollutants
Wee;11	Analysis of Water Pollutants
Week12	Analysis of Soil and Sediment Pollutants
Week13	Analysis of Biological Samples
Week14	Data Interpretation and Reporting Writing reports and communicating findings to stakeholders
Week15	Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Instant NotesIn Molecular Biology. (2005) Third Edition Phil Turner, Alexander McLennan, Andy Bates & Mike White School of Biological Sciences, University of Liverpool, Liverpool, UK	Yes

	Essentials of Molecular Biology. (2013). V. Malathi .Department of Biochemistry Ethiraj College for Women Chennai	
Recommended Texts	From Genes to Genomes. (2012) Third Edition . Jeremy W. Dale, Malcolm von Schantz and Nick Plant *University of Surrey, UK*	yes
Websites	http://www.wiley.com/go/dale/genes3e	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
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Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

University Name: AlKarkh University of Science

College Energy and Environmental Science

Module Information معلومات المادة الدراسية					
Module Title	Biodiversity			**Module Delivery**	
Module Type	C			☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code	EHS36033				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level		**UGIII**	**Semester of Delivery**		**SIX**
Administering Department		Environmental health Science	**College**	Energy and Environmental Science	
Module Leader	Dr. Khattab Al-Khafaji		**e-mail**	K.a.alkhafaji@gmail.com	
Module Leader's Acad. Title		Lecturer Dr	**Module Leader's Qualification**		PhD
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	none	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	Understand the concept of biodiversity: Introduce students to the definition and components of biodiversity, including genetic, species, and ecosystem diversity. Develop an appreciation for the complexity and interdependence of biodiversity within ecological systems. Recognize the value and importance of biodiversity: Highlight the ecological, economic, and cultural significance of biodiversity. Explore the ecosystem services provided by biodiversity, such as pollination, nutrient cycling, and climate regulation. Explore the threats to biodiversity: Identify and understand the primary drivers of biodiversity loss, including habitat destruction, invasive species, pollution, and climate change. Investigate the consequences of biodiversity loss on ecosystem stability, species extinction, and human well-being. Investigate biodiversity conservation strategies: Introduce students to different approaches and techniques for biodiversity conservation and management. Explore the role of protected areas, habitat restoration, and sustainable land use practices in conserving biodiversity. Foster an understanding of the relationship between biodiversity and sustainable development: Examine how biodiversity conservation contributes to the achievement of sustainable development goals. Explore the synergies and trade-offs between biodiversity conservation, poverty alleviation, and social equity.

	Develop practical skills in biodiversity assessment and monitoring: Provide hands-on experience in biodiversity assessment techniques, such as species identification, habitat mapping, and population surveys. Familiarize students with data collection and analysis methods used in biodiversity research. Promote interdisciplinary approaches to biodiversity conservation: Encourage collaboration between students from different disciplines, such as biology, ecology, environmental science, policy, and social sciences. Emphasize the importance of integrating scientific, social, and policy perspectives in biodiversity management. Cultivate ethical and sustainable attitudes towards biodiversity: Foster an understanding of ethical considerations related to biodiversity conservation, including the rights of indigenous communities and the equitable sharing of benefits. Encourage students to explore sustainable practices and responsible decision-making in relation to biodiversity. Encourage critical thinking and problem-solving skills: Stimulate critical analysis of scientific literature, policy documents, and case studies related to biodiversity conservation. Develop the ability to evaluate and propose innovative solutions to biodiversity challenges.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Demonstrate a comprehensive understanding of the concepts and principles of biodiversity and its relevance to environmental systems. 2. Explain the different levels of biodiversity (genetic, species, and ecosystem diversity) and their significance in maintaining ecosystem functioning. 3. Identify and describe the major threats to biodiversity and their implications for environmental sustainability. 4. Understand the value of biodiversity in providing ecosystem services and its role in supporting human well-being. 5. Apply appropriate methods and techniques for assessing and monitoring biodiversity in various ecological contexts.

	6. Collect and analyze biodiversity data using field sampling techniques, survey methodologies, and statistical analysis. 7. Interpret biodiversity indices, measurements, and indicators to assess the health and status of ecosystems. 8. Use technology tools, such as remote sensing and geographic information systems (GIS), for biodiversity assessment and monitoring. 9. Understand the principles and strategies of biodiversity conservation and management. 10. Evaluate the effectiveness of different conservation approaches, such as protected areas, habitat restoration, and species management. 11. Apply principles of sustainable land and resource management to conserve biodiversity. 12. Analyze the socio-economic and policy factors influencing biodiversity conservation efforts. 13. Identify and describe the ecosystem services provided by biodiversity, including provisioning, regulating, supporting, and cultural services. 14. Understand the economic and ecological value of ecosystem services and their contribution to human well-being. 15. Assess the interconnections between biodiversity conservation and the sustainable provision of ecosystem services. 16. Evaluate the trade-offs and synergies between biodiversity conservation and other societal goals, such as economic development. 17. Understand the impacts of environmental change, including climate change, habitat loss, and pollution, on biodiversity. 18. Assess the vulnerability of different species and ecosystems to environmental change. 19. Analyze the adaptive capacities of biodiversity and the potential for resilience in the face of environmental challenges. 20. Evaluate strategies for mitigating the impacts of environmental change and promoting biodiversity conservation.
Indicative Contents المحتويات الإرشادية	Module 1: Introduction to Biodiversity Definition and scope of biodiversity

	Importance of biodiversity for ecosystems and human well-being Levels of biodiversity: genetic, species, and ecosystem diversity Measurement and assessment of biodiversity Module 2: Biodiversity and Ecosystem Functioning Ecosystem structure and function Biodiversity-ecosystem function relationships Trophic interactions and biodiversity Biodiversity and resilience of ecosystems Module 3: Threats to Biodiversity Habitat loss and fragmentation Climate change and biodiversity Pollution and its impacts on biodiversity Invasive species and their effects on native biodiversity Module 4: Conservation and Management of Biodiversity Principles and approaches to biodiversity conservation Protected areas and their management Biodiversity conservation strategies and practices Sustainable land and resource management for biodiversity conservation Module 5: Biodiversity Hotspots and Endangered Species Biodiversity hotspots and their significance Endangered species and their conservation International agreements and initiatives for endangered species protection Case studies of successful species conservation programs Module 6: Biodiversity and Ecosystem Services Concept of ecosystem services and their links to biodiversity Provisioning, regulating, supporting, and cultural services Valuation of ecosystem services and economic importance Conservation and restoration of ecosystem services Module 7: Biodiversity Monitoring and Assessment Methods for biodiversity monitoring and assessment Sampling techniques and data analysis

	Indicators and indices for assessing biodiversity status Use of technology and remote sensing in biodiversity monitoring Module 8: Biodiversity and Human Well-being Linkages between biodiversity, human health, and well-being Cultural and spiritual values of biodiversity Traditional ecological knowledge and its role in biodiversity conservation Nature-based solutions for sustainable development and human well-being Module 9: Biodiversity Policy and Governance National and international biodiversity policies and frameworks Access and benefit-sharing of genetic resources Indigenous rights and traditional knowledge in biodiversity management Stakeholder engagement and participation in biodiversity governance Module 10: Emerging Issues and Future Directions in Biodiversity Emerging challenges and opportunities in biodiversity conservation Emerging technologies and research in biodiversity science Integration of biodiversity conservation with sustainable development goals Career opportunities and research pathways in biodiversity science

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**Active Learning Approaches:** **Incorporate hands-on activities, fieldwork, and laboratory exercises to engage students in practical biodiversity assessment and monitoring.** **Encourage students to participate in biodiversity research projects, data collection, and analysis to develop their research skills.** **Facilitate group discussions, case studies, and problem-solving exercises to enhance critical thinking and decision-making abilities.** **Integration of Theory and Practice:** **Connect theoretical concepts with real-world examples and case studies to illustrate the importance and application of biodiversity principles.**

	Provide opportunities for students to visit biodiversity-rich sites, conservation areas, and ecological research centers to observe biodiversity in its natural habitat. **Invite guest speakers from conservation organizations, government agencies, and research institutions to share their experiences and expertise.** **Multidisciplinary Approach:** **Foster collaboration and interdisciplinary learning by including students from various disciplines, such as biology, ecology, environmental science, policy, and social sciences.** **Encourage students to work in interdisciplinary teams on projects that require the integration of scientific, social, and policy perspectives.** **Use of Technology and Tools:** **Utilize technology tools, such as GIS, remote sensing, and data analysis software, to enhance biodiversity assessment and monitoring skills.** **Incorporate online databases, biodiversity databases, and citizen science platforms to expose students to real-life biodiversity data and research opportunities.** **Fieldwork and Outdoor Experiences:** **Organize field trips, biodiversity surveys, and ecological expeditions to diverse ecosystems, including forests, wetlands, marine environments, and urban landscapes.** **Conduct practical exercises and experiments in the field to provide students with hands-on experience in biodiversity sampling, identification, and data collection.** **Engagement with Local Communities:** **Foster partnerships with local communities, indigenous groups, and conservation organizations to involve students in community-based biodiversity projects.** **Encourage students to understand and appreciate traditional ecological knowledge and its relevance to biodiversity conservation.** **Critical Thinking and Problem-Solving:** **Pose challenging questions and problem scenarios that require students to analyze complex biodiversity issues, evaluate trade-offs, and propose solutions.** **Encourage students to critically evaluate scientific literature, policy documents, and research findings related to biodiversity.** **Communication and Outreach:** **Provide opportunities for students to develop communication skills by presenting their research findings, organizing awareness campaigns, or writing biodiversity reports.**

	Promote participation in environmental education programs, public outreach events, and citizen science initiatives to enhance students' ability to communicate biodiversity concepts to diverse audiences. **Ethical and Sustainability Considerations:** **Incorporate discussions and activities on ethical considerations, environmental justice, and sustainable practices in biodiversity conservation and management. Encourage students to consider the social, economic, and cultural dimensions of biodiversity and to develop environmentally responsible attitudes.** **Assessment Methods:** **Use a variety of assessment methods, including research papers, field reports, group projects, presentations, and examinations, to evaluate students' knowledge, skills, and understanding of biodiversity.**

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)**	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	**Unstructured SWL (h/w)**	
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)		
	Assignments	2	10% (10)		
	Projects	1	10% (10)		
	Report	1	10% (10)		
Summative assessment	**Midterm Exam**	2 hr	10% (10)		
	Final Exam	4hr	50% (50)		
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Introduction to Biodiversity** Definition and scope of biodiversity Importance of biodiversity for ecosystems and human well-being Levels of biodiversity: genetic, species, and ecosystem diversity Threats to biodiversity: habitat loss, climate change, pollution, invasive species Conservation and sustainable use of biodiversity
Week 2	**Biodiversity Assessment and Monitoring** Biodiversity measurement techniques: species inventories, biodiversity indices Sampling methods and data collection in the field Remote sensing and GIS applications in biodiversity monitoring Biodiversity databases and information systems Citizen science and public engagement in biodiversity monitoring
Week 3	**Ecosystem Services and Biodiversity** Concept of ecosystem services and their links to biodiversity Provisioning, regulating, supporting, and cultural services Valuation of ecosystem services and economic importance Biodiversity-based strategies for sustainable development Case studies on the role of biodiversity in specific ecosystem services (e.g., pollination, carbon sequestration)
Week 4	**Conservation and Restoration of Biodiversity** Principles and approaches to biodiversity conservation Protected areas and their management Habitat restoration and rewilding Conservation strategies for threatened and endangered species International conventions and policies for biodiversity conservation

Week 5	**Biodiversity and Climate Change** Impacts of climate change on biodiversity Species distribution modeling and climate change scenarios Biodiversity adaptation and resilience to climate change Mitigation of climate change through biodiversity conservation Synergies between biodiversity conservation and climate change action
Week 6	**Biodiversity and Human Health** Linkages between biodiversity, ecosystem health, and human health Biodiversity and infectious diseases Traditional ecological knowledge and medicinal plants Nature-based solutions for human health and well-being Ecotourism and sustainable livelihoods related to biodiversity
Week 7	**Biodiversity Policy and Governance** National and international biodiversity policies and frameworks Access and benefit-sharing of genetic resources Indigenous rights and traditional knowledge in biodiversity management Multilateral environmental agreements related to biodiversity Stakeholder engagement and participation in biodiversity governance
Week 8	**Biodiversity and Sustainable Land Management** Biodiversity in agricultural landscapes Sustainable forestry and biodiversity conservation Urban biodiversity and green infrastructure Biodiversity-friendly land-use planning and management Integrating biodiversity into environmental impact assessments
Week 9	**Biodiversity Communication and Education part1** Communication strategies for biodiversity conservation Education and awareness-raising on biodiversity
Week 10	**Biodiversity Communication and Education part2**

	Environmental education programs and initiatives Public engagement and behavior change for biodiversity conservation Role of media and technology in promoting biodiversity awareness
Week 11	**Seminars for students Applications of Biodiversity**
Week 12	**Emerging Issues and Future Directions in Biodiversity part 1** Emerging challenges and opportunities in biodiversity conservation New technologies and approaches in biodiversity research and monitoring
Week 13	**Emerging Issues and Future Directions in Biodiversity part 1** Indigenous and local community perspectives on biodiversity Biodiversity and sustainable development goals Research and career pathways in biodiversity science
Week 14	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Primack, R.B. (2014). Essentials of Conservation Biology. Sinauer Associates, Inc. Gaston, K.J., & Spicer, J.I. (2004). Biodiversity: An Introduction. Wiley-Blackwell. Wilson, E.O. (2016). Biodiversity. Harvard University Press. Heywood, V.H., & Watson, R.T. (Eds.). (1995). Global Biodiversity Assessment. Cambridge University Press.	No
Recommended Texts	Primack, R.B., & Rodrigues, E. (2012). Biologia da Conservação. Editora Artmed.	No

	Primack, R.B., & Rodrigues, E. (2015). Essentials of Conservation Biology (6th ed.). Sinauer Associates, Inc.	
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

University Name: AlKarkh University of Science

College Energy and Environmental Science

Module Information

معلومات المادة الدراسية

Module Title	Air Quality and Purification	**Module Delivery**	
Module Type	C	☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code	EHS36034		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	**UGIII**	**Semester of Delivery**	**SIX**
Administering Department	Environmental health Science	**College**	Energy and Environmental Science
Module Leader	Dr. Khattab Al-Khafaji	**e-mail**	K.a.alkhafaji@gmail.com
Module Leader's Acad. Title	Lecturer Dr	**Module Leader's Qualification**	PhD
Module Tutor		**e-mail**	
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date		**Version Number**	

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	This course explores the science of air quality, including the sources and types of air pollutants, their health and environmental impacts, and the technologies and strategies used to purify air. Students will learn about the regulatory standards for air quality, methods for monitoring and measuring air pollution, and the design and implementation of air purification systems. The course includes lectures, laboratory exercises, and field visits to provide students with practical experience in air quality management and purification.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	- To understand the fundamental concepts and principles of air quality and purification. - To identify the sources and types of air pollutants and their effects on health and the environment. - To explore the regulatory standards and guidelines for air quality. - To develop skills in monitoring, measuring, and analyzing air pollution. - To evaluate and design effective air purification systems and strategies.
Indicative Contents المحتويات الإرشادية	Emotional and value goals 1- Enable students to cooperate with each other in solving practical assignments. 2 - Enabling students to focus on the topic of the lesson and harmony and interaction with it. 3 - Enabling students to organize the information and data they receive during the lesson. 4- Enabling the students to recreate their way of thinking towards living beings and appreciating the greatness of the Almighty Creator

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**Active Learning Approaches:** **Incorporate hands-on activities, fieldwork, and laboratory exercises to engage students in practical** Air Quality and Purification **assessment and monitoring.** **Encourage students to participate in biodiversity research projects, data collection, and analysis to develop their research skills.** **Facilitate group discussions, case studies, and problem-solving exercises to enhance critical thinking and decision-making abilities.**

	Integration of Theory and Practice: **Connect theoretical concepts with real-world examples and case studies to illustrate the importance and application of air quality and purification principles.** **Provide opportunities for students to visit air quality and purification-rich sites, conservation areas, and ecological research centers to observe air quality and purification in its natural habitat.** **Invite guest speakers from conservation organizations, government agencies, and research institutions to share their experiences and expertise.** **Multidisciplinary Approach:** **Foster collaboration and interdisciplinary learning by including students from various disciplines, such as biology, ecology, environmental science, policy, and social sciences.** **Encourage students to work in interdisciplinary teams on projects that require the integration of scientific, social, and policy perspectives.** **Use of Technology and Tools:** **Utilize technology tools, such as GIS, remote sensing, and data analysis software, to enhance air quality and purification assessment and monitoring skills.** **Incorporate online databases, air quality and purification databases, and citizen science platforms to expose students to real-life air quality and purification data and research opportunities.** **Fieldwork and Outdoor Experiences:** **Organize field trips, air quality and purification surveys, and ecological expeditions to diverse ecosystems, including forests, wetlands, marine environments, and urban landscapes.** **Conduct practical exercises and experiments in the field to provide students with hands-on experience in air quality and purification sampling, identification, and data collection.** **Engagement with Local Communities:** **Foster partnerships with local communities, indigenous groups, and conservation organizations to involve students in community-based air quality and purification projects.** **Encourage students to understand and appreciate traditional ecological knowledge and its relevance to air quality and purification conservation.** **Critical Thinking and Problem-Solving:**

	Pose challenging questions and problem scenarios that require students to analyze complex air quality and purification issues, evaluate trade-offs, and propose solutions. **Encourage students to critically evaluate scientific literature, policy documents, and research findings related to air quality and purification.** **Communication and Outreach:** **Provide opportunities for students to develop communication skills by presenting their research findings, organizing awareness campaigns, or writing air quality and purification reports.** **Promote participation in environmental education programs, public outreach events, and citizen science initiatives to enhance students' ability to communicate air quality and purification concepts to diverse audiences.** **Ethical and Sustainability Considerations:** **Incorporate discussions and activities on ethical considerations, environmental justice, and sustainable practices in air quality and purification conservation and management.** **Encourage students to consider the social, economic, and cultural dimensions of air quality and purification and to develop environmentally responsible attitudes.** **Assessment Methods:** **Use a variety of assessment methods, including research papers, field reports, group projects, presentations, and examinations, to evaluate students' knowledge, skills, and understanding of air quality and purification.**

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)**	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	86	**Unstructured SWL (h/w)**	
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)		
	Assignments	2	10% (10)		
	Projects	1	10% (10)		
	Report	1	10% (10)		
Summative assessment	Midterm Exam	2 hr	10% (10)		
	Final Exam	4hr	50% (50)		
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Air Quality
Week 2	Sources and Types of Air Pollutants
Week 3	Hazardous air pollutants
Week 4	Health and Environmental Impacts of Air Pollution
Week 5	Environmental impacts of air pollution (acid rain, smog, climate change, ozone depletion)
Week 6	Air Quality Standards and Regulations
Week 7	Role of governmental and non-governmental organizations in air quality regulation
Week 8	Monitoring and Measuring Air Pollution
Week 9	Air Purification Technologies and Strategies
Week 10	Design and operation of industrial air pollution control devices (scrubbers, cyclones, baghouses, etc.)
Week 11	Indoor air quality management and purification techniques
Week 12	Emerging Technologies and Innovations in Air Purification
Week 13	Smart air purification systems
Week 14	**Exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to Air Quality and Purification
Week 2	Unit measurements of air quality
Week 3	Air Quality Monitoring System
Week 4	Air quality control devices 1
Week 5	Air quality control devices 2
Week 6	Conversions of Gaseous and Particulate Pollutants Measurement Units
Week 7	Calculation of the dangers degree for some gaseous pollutants and particulate
Week 8	Exam
Week 9	CO2 and particulate matter measurements
Week 10	SOx, NOx, PMx, Microbial measurements
Week 11	VOC measurement
Week 12	Dust pollution
Week 13	Air purification devices
Week 14	Exam
Week 15	Revise

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

Required Texts	Indoor Air Quality Engineering: Environmental Health and Control of Indoor Pollutants" by Robert J. Schnelle and Partha R. Dasgupta	No
Recommended Texts	Fundamentals of Air Pollution" by Daniel Vallero Air Quality" by Thad Godish	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	Food Safety			**Module Delivery**	
Module Type	**Core**			☒ **Lecture** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar** ☒ lab	
Module Code	EHS36035				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		3	**Semester of Delivery**		6
Administering Department		ENVIRONMENTAL health SCIENCE	**College**	ENERGY AND ENVIRONMENTAL SCIENCE	
Module Leader	Zahraa Jaafar Jameel		**e-mail**	Dr.zahraa.j@kus.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			**Version Number**		1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	To provide the students with an understanding of food contaminants and how to control the factors influencing the safety of agricultural products, and also to implement management system to ensure the safety of agricultural products
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	LO 1: Recognize and identify the food contaminants influencing the safety of agricultural products LO 2: Understand and apply properly the national and international legislation/ regulation LO 3: Implement food safety management systems for primary production LO 4: Evaluate food safety management systems and recommend the preventive measures LO5: To be able to research a topic, synthesis current information and develop a presentation related to food safety and food quality
Indicative Contents المحتويات الإرشادية	Food safety is a management system that is applied by a food business to ensure that potential hazards are controlled to acceptable levels. Food safety concerns all types of hazards and includes the system of corrective actions, monitoring, and how to achieve safe.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Lecture Discussion Seminar

	Report

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	86	**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	10% (10)	5 and 10	
	Assignments	2	10% (10)	2 and 12	
	Lab practical	1	10% (10)	Continuous	
	Report	1	10% (10)	13	
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 الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Food Safety
Week 2	Foodborne Hazards
Week 3	Microbiology in Food Safety
Week 4	Food Contamination and Spoilage
Week 5	Food Preservation Techniques
Week 6	Food Safety Management Systems
Week 7	Food Safety Regulations and Standards
Week 8,9	Food Hygiene and Sanitation
Week 10	Food Safety in the Supply Chain
Week 11	Emerging Issues in Food Safety
Week 12	Food Safety Testing and Analysis
Week 13	Risk Assessment and Communication
Week 14	seminar
Week 15	**Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts		
Recommended Texts	FAO (Food and Agricultural organization): /http://www.fao.org/home/en	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

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Environmental Health Genetics			**Module Delivery**	
Module Type	**Core**			☒ **Lecture** ☒ **lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	EHS36036				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	3		**Semester of Delivery**	6	
Administering Department	ENVIRONMENTAL health SCIENCE		**College**	ENERGY AND ENVIRONMENTAL SCIENCE	
Module Leader	Zahraa Jaafar Jameel		**e-mail**	Dr.zahraa.j@kus.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			**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Environmental factors, as related to genetics, refers to exposures to substances (such as pesticides or industrial waste) where we live or work, behaviors (such as smoking or poor diet) that can increase an individual's risk of disease or stressful situations. Gene–environment interaction refers to the interplay of genes (and, more broadly, genome function) and the physical and social environment. These interactions influence the expression of phenotypes. For example, most human traits and diseases are influenced by how one or more genes interact in complex ways with environmental factors, such as chemicals in the air or water, nutrition, ultraviolet radiation from the sun and social context.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	this course show how environmental factors influence a diverse array of molecular mechanisms and consequently alter disease risk. They emphasize the plasticity of the genome and its regulation, providing support for genomic reaction and adaptation in response to environmental stimuli. Further, they provide direct evidence that chemicals placed in the environment by human activity can and do promote disease by altering gene expression.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Basic Genetics and Genomics, Environmental Factors and Health, Gene-Environment Interactions, Methods for studying gene-environment interactions, Integration of genetic information into environmental health practice, ……etc

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Lecture

	Discussion Seminar Report

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	86	**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	10% (10)	5 and 10	
	Assignments	2	10% (10)	2 and 12	
	Lab practical	1	10% (10)	Continuous	
	Report	1	10% (10)	13	
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 الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Environmental Health Genetics
Week 2	Basic Genetics and Genomics
Week 3	Environmental Factors and Health
Week 4	Gene-Environment Interactions
Week 5	Genetic Susceptibility to Environmental Exposures
Week 6	Methods for studying gene-environment interactions (e.g., epidemiological studies, molecular biology techniques)
Week 7	Public Health Implications
Week 8,9	Advances in environmental health genetics
Week 10	Integration of genetic information into environmental health practice
Week 11	Environmental Exposures and Human Genetic Variation
Week 12	Air Pollution, Activation of Inflammatory Genes, and Respiratory Disease
Week 13	Pharmaceuticals, Gene Amplification/Mutation, and Drug Resistance
Week 14	Seminar
Week 15	**Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	**equipment's & materials commonly used in a laboratory**
Week 2	Cell anatomy
Week 3	Monohybrid cross
Week 4	Dihybrid cross
Week 5	Environmental Factors and Health
Week 6	Gene-Environment Interactions
Week 7	human chromosomes morphology
Week 8	human chromosomes disorder
Week 9	DNA isolation (purification)
Week 10	Agarose gel electrophoresis
Wee;11	What are the primers
Week12	Polymerase chain reaction
Week13	Mutation process, and Drug Resistance
Week14	Seminar
Week15	Examination

Learning and Teaching Resources

مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts		
Recommended Texts	**adula A, Yang W, Schultz K, Lee C, Lurmann F, Hammond S, Shaw G, Gene–environment interactions between air pollution and biotransformation enzymes and risk of birth defects,** Birth Defects Research, **10.1002/bdr2.1880,** 113**, 9, (676-686), (2021).** Samir N Kelada, David L Eaton, Sophia S Wang, Nathaniel R Rothman, and Muin J Khoury 2003 The role of genetic polymorphisms in environmental health. Environmental Health Perspectives 111:8 CID: https://doi.org/10.1289/ehp.6065	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
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Epidemiology**			**Module Delivery**	
Module Type	**Core**			☒ **Lecture** ☐ **Tutorial** ☐ **Practical** ☒**Seminar**	
Module Code	**EHS36037**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	3		**Semester of Delivery**	6	
Administering Department	ENVIRONMENTAL health SCIENCE		**College**	ENERGY AND ENVIRONMENTAL SCIENCE	
Module Leader	Zahraa Jaafar Jameel		**e-mail**	Dr.zahraa.j@kus.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	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Students will gain understanding of the fundamental concepts of epidemiology and its role in public health research and investigation. Students will become familiar with epidemiologic terminologies, outcome measures, and study designs in an effort to apply epidemiologic methods to other related fields and programs of study.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Intended Learning Outcomes (ILOs) will be achieved via student's ability to: 1-Caring: - Apply basic epidemiological concepts to current health problems. -Define appropriate comparison groups for epidemiologic studies. -Interpret descriptive and inferential statistics results and find relative conclusions. - Apply concepts of bias and confounding to care provided to clients. 2-Communication:

	-Communicate results of Risk values (including Relative Risk and Odds Ratios), appropriately. 3-Critical Thinking: -Understand basic concepts and methods of epidemiology. - Differentiate between exposure variables, outcome variables, and extraneous variables. - Understand criteria of causal relationships. - Analyze conclusions of research and popular media concerning health problems. - Understand major study designs focusing on populations of different characteristics. - Critique the study design, variables, confounders, bias issues in quantitative studies. 4-Therapeutic Intervention -Apply causal relationships to some investigations in the field of allied sciences. - Evaluate quality of collected data. - Apply values of Risk measurements to the filed of study and its clients. - Apply concepts of confounding and bias to descriptive and analytic studies. Leadership: - Propose strategies to promote health at selected fields. - Identify sources of epidemiologic data. - Identify public health problems in terms of place, time, and person. - Apply epidemiologic method to identify health problems, formulate hypotheses, set study (design, analyze data, and interpret results)

	5-Employers' Satisfaction - Find ways to market self through presenting different treatment modalities to the consumer. - Convince employer of presence of possible bias and confounders in some study findings based on nature of studies.
Indicative Contents المحتويات الإرشادية	Course Description: The field of epidemiology, including its history and contribution to public health, is highly essential in a variety of undergraduate and graduate degree programs. Subjects of epidemiology are required in public health, environmental health, nursing, health research, and other health-related disciplines. This course introduces students to fundamentals of epidemiology including basic concepts and methods used in epidemiology. The overall purpose of this course is to help students understand how epidemiology contributes to: (1) assessment of diseases, (2) identifying factors associated/causing diseases, (3) describing history of disease, and (4) providing procedures for prevention and controlling diseases. Issues of protection, prevention, needs assessment, and risk analysis is introduced.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Method of lecturing 2. Student Center 3. Team Project 4. Work Shop 5. Scientific trips to monitor environmental pollution 6. Learning Technologies on Campus 7. Experiential Learning 8. Application Learning

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	
	Assignments	2	10% (10)	2 and 12	
	seminar	1	10% (10)	Continuous	
	Report	1	10% (10)	13	
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 الاسبوعي النظري	
	Material Covered
Week 1	**Introduction to Epidemiology**
Week 2	Foundations of epidemiology - Related definitions - The epidemiology triangle - Modes of disease transmission - Chain of infection - Levels of prevention
Week 3	Practical Disease Concepts in Epidemiology - Communicable and noncommunicable diseases - Natural history of disease - Classifications of disease
Week 4	Practical Disease Concepts in Epidemiology - Portals of entry to human body - Protecting public health through immunization - Communicable disease prevention and control - Disability
Week 5	**Descriptive Epidemiology According to Person, Place, and Time:** **- Public health surveillance - Person - Place – Time**

Week 6	**General Health and Population Indicators** **- Health indicators** **- Selected health indicators**
Week 7	**First exam**
Week 8,9	**Design Strategies and Statistical Methods in Descriptive Epidemiology** **- Related definitions** **- Descriptive study designs** **- Types of data** **- Ratios, proportions, and rates** **- Tables, Graphs, and Numerical Measure** **- Measures of statistical association**
Week 10	**Measures if Disease Frequency** **-Measuring disease occurrence** **-Measures of disease frequency** **- Data organization**
Week 11	**Bias and Confounding** **-Major types of bias** **-Confounding** **- Controlling for confounding**

Week 12	**Design Strategies and Statistical Methods in Analytic Epidemiology** **-Observational analytic studies** **-Odds Ratio in case-control studies** **-Bias in case-control studies** **-Strengths and weaknesses of case-control studies** **-Risk Ratio in cohort studies** **-Bias in cohort studies** **- Strengths and weaknesses of cohort studies**
Week 13	**Chronic Disease Epidemiology** **-Chronic disease** **-The Environment and Chronic health problems** **-Behavior and chronic health problems** **- Heredity and chronic health problems**
Week 14	Clinical Epidemiology - Screening and diagnosis - Validity, reliability, and yield - Evaluating the screening test
Week 15	**Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts		
Recommended Texts	Merrill, R., M. (2013). Introduction to Epidemiology. .Burlington: Jones and Bartlett Learning	No

	.Sixth edition Aschengrau, A., & Seage III, G. (2008). Essentials of Epidemiology in Public Health. Jones and Bartlett Publisher, LLC. Second edition OR Botina, R., Beaglehole, R, Kjellstrom, T. (2006). Basic Epidemiology. Geneva: World Health .Organization. 2nd Edition Gordis, L. (2000). Epidemiology. Philadelphia: W.B. Saunders. 2nd Edition	
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

University Name: AlKarkh University of Science

College Energy and Environmental Science

Dept: environmental health sciences

Module Information معلومات المادة الدراسية					
Module Title	Scientific research methods			**Module Delivery**	
Module Type	**core**			☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	EHS47039				
ECTS Credits	2				
SWL (hr/sem)	50				
Module Level	**4**		**Semester of Delivery**	**7**	
Administering Department	Environmental health science		**College**	Energy and Environmental Sciences	
Module Leader	Dr. zahraa jaafar jameel		**e-mail**	Dr.zahraa.j@kus.edu	
Module Leader's Acad. Title	Assistant prof.		**Module Leader's Qualification**	PhD	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Develop a comprehensive understanding of conductive research 2. Familiarize students with the study design 3. Equip students with knowledge and skills in the writing of references. 4. Develop an understanding of type of research 5. Provide hands-on writing of research project. 6. Read of paper on journals or thesis or book 7. How to citation on text 8. Components of research project.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	21. Demonstrate a comprehensive understanding of conductive research. 22. Apply knowledge of type of research. 23. Employ various characterization methods to analyze the study design. 24. Explain the research project. 25. Design and optimize conductive the components of research project. 26. Evaluate the method of sampling. 27. Rule of citation. 28. Identify style of citation. 29.
Indicative Contents المحتويات الإرشادية	**24. Introduction to research** **25. Study design** **26. proposal** **27. eight steps of research** **28. components of research**

	29. citation **Applications**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**Lectures**: Traditional lectures can be used to deliver foundational knowledge on conductive polymers, their properties, and applications. Lectures can also include discussions on historical developments and key concepts. **Case Studies**: Case studies can be used to explore real-world applications of conductive polymers. Students can analyze and discuss the challenges, opportunities, and outcomes of specific projects or industry collaborations, allowing them to gain insights into practical applications. **Group Discussions and Debates**: Group discussions encourage active participation and critical thinking. Students can engage in debates on topics such as the future of conductive polymers, ethical considerations, or emerging applications. This promotes collaborative learning and develops communication skills. **Problem-Based Learning**: Students can be presented with open-ended problems or scenarios related to conductive polymers. They can work in groups to analyze the problem, propose solutions, and present their findings. This fosters analytical thinking and problem-solving skills. **Research Projects**: Assigning research projects to students allows them to explore specific aspects of conductive polymers in depth. They can conduct literature reviews, design experiments, and analyze data, contributing to the advancement of knowledge in the field. **Presentations and Poster Sessions**: Assigning presentations or poster sessions allows students to communicate their research findings or assigned topics effectively. This develops their presentation skills, promotes peer learning, and encourages critical evaluation of information. **Formative and Summative Assessments**: Regular formative assessments, such as quizzes or group projects, can help monitor students' progress. Summative assessments, such as examinations or research reports, evaluate students' understanding and mastery of the curriculum.

Student Workload (SWL)

الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)**	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)**	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)		
	Assignments	2	10% (10)		
	Projects	1	10% (10)		
	Report	1	10% (10)		
Summative assessment	Midterm Exam	2 hr	10% (10)		
	Final Exam	2hr	50% (50)		
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction of research methodology
Week 2	Type of research
Week 3	Research design
Week 4	Research proposal
Week 5	Eight-step model for carrying out research
Week 6	Citation and references1
Week 7	Citation and references2

Week 8	Citation and references3
Week 9	Rewriting the sentences
Week 10	Writing article from research project report Conversion of thesis to journal article
Week 11	Content of thesis(chapters)
Week 12	Content of thesis(chapters)
Week 13	Exam2
Week 14	Visiting of library
Week 15	**seminar**
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Kumar, R. (2011) Research Methodology: A Step-by-Step Guide for Beginners. 3rd Edition. Sage, New Delhi.	No
Recommended Texts		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 Impact Assessment**			**Module Delivery**	
Module Type	**Core**			☐ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	**EHS47040**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	4		**Semester of Delivery**	7	
Administering Department	Environmental health Science		**College**	College of Energy and Environmental Sciences	

Module Leader	Maad A. Hussein	**e-mail**	maad@kus.edu.iq
Module Leader's Acad. Title	Lecture	**Module Leader's Qualification**	Ph.D.
Module Tutor		**e-mail**	
Peer Reviewer Name		**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 Objectives أهداف المادة الدراسية	1- Application of academic programs for environmental sciences. 2- Knowledge of the principles of environmental impact assessment (EIA(. 3- Provide a working knowledge of current environmental, social and economic impacts and methods relating to EIA. 4- Consider in detail how these impacts can be quantified and analyzed. 5- Graduating specialists in the field of environmental sciences with the highest efficiency to deal with all environmental issues.
Module Learning Outcomes	1. Gain an understanding of the role of EIA in decision making 2. Gain an overview of the legislative framework for EIA, with a focus towards its application in Iraq.

مخرجات التعلم للمادة الدراسية	3. Have knowledge of the EIA process and stages, and how it is applied to specific topic areas, such as landscape and visual impact assessment, ecology, soils and climate change, including its application. 4. Be skilled in review and appraisal of the EIA process and its outputs. 5. Be able to understand the relationship between EIA and development decisions and understand the ways in which EIA can contribute to sustainable development and project design, and its limitations in this regard.
Indicative Contents المحتويات الإرشادية	The module requires the completion of the following parts: Week 1 - Introduction to the course and to Environmental Impact Assessment (EIA). Brief explanation of all assignments. Carrying out an EIA – key stages. Key principles of Strategic Environmental Assessment (SEA) and how it relates to EIA, Week 2 - Key implementation problems of the EIA process. The quality of Environmental Impact Statements (EIS). Week 3 - Data for EIA. Carrying out an EIA – key methods. Use of GIS for EIA. Uncertainty and subjectivity issues. Consultation and public participation in EIA. The importance of scale issues in EIA and the case for scale guidelines. Week 4 - Mitigation, enhancement issues and the use of EIA as a design tool. Key principles of ecological impact assessment. What are Environmental Management Plans (EMPs), how EMPs link to EIA and the role of the Environmental Clerk of Works. Adaptive management. Week 5 - Consultation and public participation in EIA. Cumulative effects assessment. Follow-up. The value of EIA. Scenario simulation. Week 6 - Understanding the relationship between EIAs and development decisions – the case of a controversial development. Week 7 - Social Impact Assessment – key principles and links to EIA. Week 8 –Wind Farm and onshore grid connection (buried cable and substation), Environment Manager, Mainstream Renewable Power. Week 9 - EIA of onshore wind farm development. Week 10 - Discussion about the material covered in the class, and on enhancement issues and the use of EIA as a design tool. What are Environmental Management Plans (EMPs), how EMPs link to EIA and the role of the Environmental Clerk of Works. **N.B. The class runs over 10 weeks.**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The course provides an overview of the legislative framework of EIA and explains the EIA process, providing examples of techniques used in impact assessment relating to topics including soils, ecology and landscape. Much of the teaching input to the course is provided by external practitioners specializing in certain aspects of the EIA process, including developers, representatives from local government and other key stakeholders, as well as EIA consultants

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	87	**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**	1	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	1	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects	1	10% (10)	Continuous	All

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to the course and to Environmental Impact Assessment (EIA).
Week 2	Key implementation problems of the EIA process.
Week 3	Data for EIA. Carrying out an EIA – key methods.
Week 4	Mitigation, enhancement issues and the use of EIA as a design tool.
Week 5	Consultation and public participation in EIA.
Week 6	Understanding the relationship between EIAs and development decisions.
Week 7	Social Impact Assessment.
Week 8	Wind Farm and onshore grid connection.
Week 9	EIA of onshore wind farm development.
Week 10	Mitigation, monitoring and management of environmental impacts
Week 11	Approaches to EIA presentation and report writing
Week 12	Strategic Environmental Assessment
Week 13	Discussion about the material covered in the class.

Week 14	Exams
Week 15	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Glasson, J, Therivel, R (2019). Introduction to Environmental Impact Assessment. Routledge London.	No
Recommended Texts	Morris, P & Therivel, R (2018). Methods of Environmental Impact Assessment. Routledge London.	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

University Name: AlKarkh University of Science

Module Information معلومات المادة الدراسية					
Module Title	Virology			**Module Delivery**	
Module Type	**core**			☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	EHS47041				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	**4**		**Semester of Delivery**	**7**	
Administering Department	Environmental health science		**College**	Energy and Environmental Sciences	
Module Leader	Dr. zahraa jaafar jameel		**e-mail**	Dr.zahraa.j@kus.edu	
Module Leader's Acad. Title	Assistant prof.		**Module Leader's Qualification**	PhD	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	This course provides a comprehensive overview of virology, covering the biology of viruses, their structure, replication, and interaction with host cells. It explores the mechanisms of viral pathogenesis, the host immune response to viral infections, and the development of antiviral therapies and vaccines. Through lectures, discussions, and laboratory sessions, students will gain a thorough understanding of virology and its applications in research and clinical settings.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	30. Understand the basic concepts and principles of virology. 31. Describe the structure and classification of viruses. 32. Explain the mechanisms of viral replication and pathogenesis. 33. Analyze the interactions between viruses and host cells. 34. Discuss the immune response to viral infections. 35. Identify the strategies used for the prevention and treatment of viral diseases. 36. Apply virological knowledge to solve problems in health and disease.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Viral Structure and Classification, Viral Replication and Life Cycle, Virus-Host Interactions, Immune Response to Viral Infections, Antiviral Therapies and Vaccines, …..etc

Learning and Teaching Strategies استراتيجيات التعلم والتعليم

Strategies	**Lectures**: Traditional lectures can be used to deliver foundational knowledge on conductive polymers, their properties, and applications. Lectures can also include discussions on historical developments and key concepts. **Case Studies**: Case studies can be used to explore real-world applications of conductive polymers. Students can analyze and discuss the challenges, opportunities, and outcomes of specific projects or industry collaborations, allowing them to gain insights into practical applications. **Group Discussions and Debates**: Group discussions encourage active participation and critical thinking. Students can engage in debates on topics such as the future of conductive polymers, ethical considerations, or emerging applications. This promotes collaborative learning and develops communication skills. **Problem-Based Learning**: Students can be presented with open-ended problems or scenarios related to conductive polymers. They can work in groups to analyze the problem, propose solutions, and present their findings. This fosters analytical thinking and problem-solving skills. **Research Projects**: Assigning research projects to students allows them to explore specific aspects of conductive polymers in depth. They can conduct literature reviews, design experiments, and analyze data, contributing to the advancement of knowledge in the field. **Presentations and Poster Sessions**: Assigning presentations or poster sessions allows students to communicate their research findings or assigned topics effectively. This develops their presentation skills, promotes peer learning, and encourages critical evaluation of information. **Formative and Summative Assessments**: Regular formative assessments, such as quizzes or group projects, can help monitor students' progress. Summative assessments, such as examinations or research reports, evaluate students' understanding and mastery of the curriculum.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)**	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	86	**Unstructured SWL (h/w)**	
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)		
	Assignments	2	10% (10)		
	Projects/ lab	1	10% (10)		
	Report	1	10% (10)		
Summative assessment	**Midterm Exam**	2 hr	10% (10)		
	Final Exam	2hr	50% (50)		
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Virology
Week 2	Viral Structure and Classification
Week 3	Viral Replication and Life Cycle
Week 4	Virus-Host Interactions
Week 5	Viral Pathogenesis and Disease
Week 6	Immune Response to Viral Infections
Week 7	Diagnosis and Detection of Viral Infections
Week 8	Antiviral Therapies and Vaccines
Week 9	Zoonotic viruses and their transmission
Week 10	Global surveillance and response to viral outbreaks
Week 11	Viral Vectors and Gene Therapy
Week 12	Virology in Research and Public Health

Week 13	Bacteriophage
Week 14	Seminar
Week 15	**Exam**
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	"Principles of Virology" by Jane Flint, Vincent R. Racaniello, Glenn F. Rall, Anna Marie Skalka	No
Recommended Texts		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	solid and hazardous waste management			**Module Delivery**	
Module Type	Core			☒ Lecture ☐ Lab ☐ Tutorial ☒ Practical ☐ Seminar	
Module Code	EHS47042				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	4		**Semester of Delivery**	7	
Administering Department	Environmental health Science		**College**	College of Energy and Environmental Sciences	
Module Leader	Maad A. Hussein		**e-mail**	maad@kus.edu.iq	
Module Leader's Acad. Title	Lecture		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**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 Objectives أهداف المادة الدراسية	1- Application of academic programs for environmental sciences. 2- Knowledge of the principles of solid and hazardous waste management. 3- Knowing and studying the concepts of waste management, its types and methods of separating it. 4- Knowing and studying the concepts of optimal waste disposal and recycling methods. 5- Studying the design and management of sanitary landfills and their optimal use. 6- Graduating specialists in the field of environmental sciences with the highest efficiency to deal with all solid and hazardous materials and waste.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	6. Provide the student with the necessary knowledge about the science of waste management and its applications in the field of the environment. 7. Enabling students to understand the basics of the subject and its scientific requirements. 8. Equipping students with sound thinking methods (deductive thinking, scientific thinking, critical thinking, creative thinking, ...). 9. Preparing specialists in the field of the environment who are distinguished by a high level of knowledge and technological innovation, in line with the strict standards adopted globally in quality assurance and academic accreditation of the corresponding scientific programs.

Indicative Contents المحتويات الإرشادية	1. INTRODUCTION 2. SOLID WASTE MANAGEMENT SYSTEM 3. TYPES OF SOLID WASTE 4. PROSPERITIES OF SOLID WASTE 5. Generation Rates 6. Materials-Balance Analysis 7. Factors that affect the generation rates 8. On-Site Storage 9. ON-SITE PROCESSING OF SOLID WASTE 10. Waste Management 3R Concept 11. Hazardous Waste Management 11. Disposal and Design of landfills

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Skills of analyzing, separating and isolating waste. 2. Knowledge of hazardous waste and methods of evaluating and dealing with it. 3. Knowledge of the waste management hierarchy and the priorities followed in optimal waste management. 4. Enabling students to play a prominent role as specialists in the field of the environment and finding ideal solutions to reduce the impact.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem)	63	**Structured SWL (h/w)**	4

الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	87	**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**	1	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	1	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	INTRODUCTION

Week 2	SOLID WASTE MANAGEMENT SYSTEM
Week 3	TYPES OF SOLID WASTE
Week 4	PROSPERITIES OF SOLID WASTE
Week 5	Exams
Week 6	Generation Rates
Week 7	Materials-Balance Analysis
Week 8	Factors that affect the generation rates
Week 9	On Site Storage
Week 10	ON-SITE PROCESSING OF SOLID WASTE
Week 11	Waste Management 3R Concept
Week 12	Hazardous Waste Management
Week 13	Hazardous Waste Management
Week 14	Disposal and Design of landfills
Week 15	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	INTEGRATED SOLID WASTE MANAGEMENT	No
Recommended Texts	Hazardous WASTE MANAGEMENT, 2nd edition by Micheal D. LaGrea	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

University Name: AlKarkh University of Science

Module Information معلومات المادة الدراسية		
Module Title	Bioremediation	**Module Delivery**
Module Type	**core**	☒ **Lecture** ☒**Lab** ☐ **Tutorial** ☐ **Practical**
Module Code	EHS47044	
ECTS Credits	5	

SWL (hr/sem)	125	☐ **Seminar**	
Module Level	**4**	**Semester of Delivery**	**7**
Administering Department	Environmental health science	**College**	Energy and Environmental Sciences
Module Leader	Dr. Alaa J. Mohameed	**e-mail**	
Module Leader's Acad. Title		**Module Leader's Qualification**	PhD
Module Tutor		**e-mail**	
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date		**Version Number**	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The goal of bioremediation is to reduce or remove toxins from an environment that were introduced by contaminants from human activity, like industry, or farming. Bioremediation aims to clean up polluted sites in an environmentally friendly and affordable way.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	37. Understand the basic concepts and principles of bioremediation 38. Describe the structure and classification of bioremediation. 39. Explain the mechanisms of bioremediation. 40. Analyze the interactions in bioremediation

	41. Identify the strategies used for the bioremediation. 42. Apply bioremediation knowledge to solve problems in health.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Bioremediation Types, Advantages, and Limitations, Microbial Bioremediation, Phytoremediation, Environmental Factors Affecting Bioremediation, …..etc

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**Lectures**: Traditional lectures can be used to deliver foundational knowledge on conductive polymers, their properties, and applications. Lectures can also include discussions on historical developments and key concepts. **Case Studies**: Case studies can be used to explore real-world applications of conductive polymers. Students can analyze and discuss the challenges, opportunities, and outcomes of specific projects or industry collaborations, allowing them to gain insights into practical applications. **Group Discussions and Debates**: Group discussions encourage active participation and critical thinking. Students can engage in debates on topics such as the future of conductive polymers, ethical considerations, or emerging applications. This promotes collaborative learning and develops communication skills. **Problem-Based Learning**: Students can be presented with open-ended problems or scenarios related to conductive polymers. They can work in groups to analyze the problem, propose solutions, and present their findings. This fosters analytical thinking and problem-solving skills. **Research Projects**: Assigning research projects to students allows them to explore specific aspects of conductive polymers in depth. They can conduct literature reviews, design experiments, and analyze data, contributing to the advancement of knowledge in the field. **Presentations and Poster Sessions**: Assigning presentations or poster sessions allows students to communicate their research findings or assigned topics effectively. This develops their presentation skills, promotes peer learning, and encourages critical evaluation of information. **Formative and Summative Assessments**: Regular formative assessments, such as quizzes or group projects, can help monitor students' progress. Summative assessments, such as examinations or research reports, evaluate students' understanding and mastery of the curriculum.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)**	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	**Unstructured SWL (h/w)**	
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)		
	Assignments	2	10% (10)		
	Projects/ lab	1	10% (10)		
	Report	1	10% (10)		
Summative assessment	**Midterm Exam**	2 hr	10% (10)		
	Final Exam	2hr	50% (50)		
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Bioremediation
Week 2	Bioremediation Types, Advantages, and Limitations
Week 3	Microbial Bioremediation: Microbial metabolism and biodegradation

	Aerobic and anaerobic processes
Week 4	Microbial Bioremediation: Bacterial, fungal, and algal roles Genetic engineering for enhanced degradation
Week 5	Phytoremediation: Mechanisms: phytoextraction, phytostabilization, phytodegradation, rhizofiltration
Week 6	Phytoremediation: Case studies: heavy metal uptake, wastewater treatment and types of plants
Week 7	Environmental Factors Affecting Bioremediation
Week 8	Contaminants and Bioremediation Approaches
Week 9	Contaminants: Pesticides and xenobiotics Plastics and microplastics
Week 10	Bioreactors: types and design
Week 11	Monitoring and Assessment
Week 12	Applications and Case Studies
Week 13	Analytical and Monitoring Techniques
Week 14	Bioremediation Policy, Ethics & Risk Assessment
Week 15	**Exam**
Week 16	**Preparatory week before the final Exam**

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

Required Texts		No
Recommended Texts		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

University Name: AlKarkh University of Science

Module Information معلومات المادة الدراسية

Module Title	water and waste water treatment			**Module Delivery**	
Module Type	**core**			☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	EHS48046				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	**4**		**Semester of Delivery**	**8**	
Administering Department	Environmental health science		**College**	Energy and environmental science	
Module Leader	Dr. zahraa jaafar jameel		**e-mail**	Dr.zahraa.j@kus.edu	
Module Leader's Acad. Title	Assistant prof.		**Module Leader's Qualification**	PhD	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	This course provides an introduction to the principles and practices of water and wastewater treatment. It covers the physical, chemical, and biological processes used to remove contaminants from water and wastewater to meet environmental and public health standards. Students will learn about the design, operation, and

	maintenance of treatment facilities and the latest technological advancements in the field.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	43. Understand the fundamental concepts of water and wastewater treatment. 44. Describe the various physical, chemical, and biological treatment processes. 45. Analyze the design and operation of water and wastewater treatment plants. 46. Evaluate the effectiveness and efficiency of treatment methods. 47. Discuss the regulatory framework and standards for water quality. 48. Apply knowledge of treatment processes to solve real-world water and wastewater management problems.
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**Lectures**: Traditional lectures can be used to deliver foundational knowledge on conductive water treatment , their properties, and applications. Lectures can also include discussions on historical developments and key concepts. **Case Studies**: Case studies can be used to explore real-world applications of conductive water treatment . Students can analyze and discuss the challenges, opportunities, and outcomes of specific projects or industry collaborations, allowing them to gain insights into practical applications. **Group Discussions and Debates**: Group discussions encourage active participation and critical thinking. Students can engage in debates on topics such as the future of conductive water treatment , ethical considerations, or emerging applications. This promotes collaborative learning and develops communication skills. **Problem-Based Learning**: Students can be presented with open-ended problems or scenarios related to conductive water treatment . They can work in groups to analyze the problem, propose solutions, and present their findings. This fosters analytical thinking and problem-solving skills. **Research Projects**: Assigning research projects to students allows them to explore specific aspects of conductive water treatment in depth. They can conduct literature reviews, design experiments, and analyze data, contributing to the advancement of knowledge in the field. **Online Resources and Virtual Tools**: Utilizing online resources, digital simulations, and virtual tools can enhance learning. These resources can provide interactive

	demonstrations, virtual experiments, and supplementary materials for self-paced learning. **Presentations and Poster Sessions**: Assigning presentations or poster sessions allows students to communicate their research findings or assigned topics effectively. This develops their presentation skills, promotes peer learning, and encourages critical evaluation of information. **Formative and Summative Assessments**: Regular formative assessments, such as quizzes or group projects, can help monitor students' progress. Summative assessments, such as examinations or research reports, evaluate students' understanding and mastery of the curriculum.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)**	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	86	**Unstructured SWL (h/w)**	
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)		
	Assignments	2	10% (10)		
	Projects/lab	1	10% (10)		
	Report	1	10% (10)		
Summative assessment	**Midterm Exam**	2 hr	10% (10)		
	Final Exam	4hr	50% (50)		
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	: Introduction to Water and Wastewater Treatment
Week 2	Water Treatment Processes
Week 3	Wastewater Treatment Processes
Week 4	Wastewater Treatment Processes2
Week 5	Biological Treatment of Wastewater
Week 6	Chemical Treatment of Water and Wastewater
Week 7	Physical Treatment of Water and Wastewater
Week 8	Membrane Technologies in Water and Wastewater Treatment
Week 9	Membrane Technologies in Water and Wastewater Treatment2
Week 10	Design and Operation of Treatment Plants
Week 11	Water Quality Monitoring and Control
Week 12	Sustainability and Innovation in Water and Wastewater Treatment
Week 13	Water reuse and recycling technologies
Week 14	Seminar
Week 15	**Exam**
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي العملي	
Week 1	Introduction to water/wastewater sampling methods
Week2	Determination of pH, temperature, turbidity, and electrical conductivity (EC)
Week 3	Organic Content Analysis
Week 4	Acidity and Hardness
Week 5	Heavy Metal Analysis
Week 6	Microbiological Analysis
Week 7	Coagulation and Flocculation Test

Week8	Filtration and Disinfection
Week 9	adsorption test
Week 10	phytoremediation test
Week 11	Wastewater Samp ling: Techniques for collection, preservation, and storage
Week 12	Physical Characteristics: Measurement of TSS, turbidity, color, temperature
Week13	Chemical Characteristics: COD, BOD_5, pH, alkalinity, conductivity
Week 14	Field Visit: Visit to a municipal/industrial wastewater plant
Week 15	Data Analysis: Lab report preparation, calculations, plotting
Week 16	Mini-research project

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Water and Wastewater Engineering: Design Principles and Practice" by Mackenzie L. Davis	No
Recommended Texts		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

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

University Name: AlKarkh University of Science

Module Information معلومات المادة الدراسية					
Module Title	transmission diseases			**Module Delivery**	
Module Type	**core**			☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code	EHS48047				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	**4**		**Semester of Delivery**	**8**	
Administering Department	Environmental health science		**College**	Energy and Environmental Sciences	
Module Leader	Dr. zahraa jaafar jameel		**e-mail**	Dr.zahraa.j@kus.edu	
Module Leader's Acad. Title	Assistant prof.		**Module Leader's Qualification**	PhD	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	This course examines the mechanisms, patterns, and factors influencing the transmission of infectious diseases. It covers the biological, environmental, and social aspects of disease spread and the strategies used to prevent and control infections. Through lectures, case studies, and discussions, students will gain a comprehensive understanding of how diseases are transmitted and the measures used to manage outbreaks.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the basic principles and concepts of disease transmission. 2. Identify the different modes of transmission for infectious diseases. 3. Analyze the factors that influence the spread of diseases in populations. 4. Discuss the role of vectors, reservoirs, and hosts in disease transmission. 5. Evaluate the effectiveness of public health interventions and control measures. 6. Apply knowledge of disease transmission to develop strategies for outbreak management.
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**Lectures**: Traditional lectures can be used to deliver foundational knowledge on conductive polymers, their properties, and applications. Lectures can also include discussions on historical developments and key concepts. **Case Studies**: Case studies can be used to explore real-world applications of conductive polymers. Students can analyze and discuss the challenges, opportunities,

	and outcomes of specific projects or industry collaborations, allowing them to gain insights into practical applications. **Group Discussions and Debates**: Group discussions encourage active participation and critical thinking. Students can engage in debates on topics such as the future of conductive polymers, ethical considerations, or emerging applications. This promotes collaborative learning and develops communication skills. **Problem-Based Learning**: Students can be presented with open-ended problems or scenarios related to conductive polymers. They can work in groups to analyze the problem, propose solutions, and present their findings. This fosters analytical thinking and problem-solving skills. **Research Projects**: Assigning research projects to students allows them to explore specific aspects of conductive polymers in depth. They can conduct literature reviews, design experiments, and analyze data, contributing to the advancement of knowledge in the field. **Online Resources and Virtual Tools**: Utilizing online resources, digital simulations, and virtual tools can enhance learning. These resources can provide interactive demonstrations, virtual experiments, and supplementary materials for self-paced learning. **Presentations and Poster Sessions**: Assigning presentations or poster sessions allows students to communicate their research findings or assigned topics effectively. This develops their presentation skills, promotes peer learning, and encourages critical evaluation of information. **Formative and Summative Assessments**: Regular formative assessments, such as quizzes or group projects, can help monitor students' progress. Summative assessments, such as examinations or research reports, evaluate students' understanding and mastery of the curriculum.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)**	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	**Unstructured SWL (h/w)**	
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)		
	Assignments	2	10% (10)		
	Projects	1	10% (10)		
	Report	1	10% (10)		
Summative assessment	Midterm Exam	2 hr	10% (10)		
	Final Exam	3hr	50% (50)		
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Disease Transmission
Week 2	Modes of Transmission
Week 3	Vectors and Reservoirs of Infection
Week 4	Strategies for vector control and reservoir management
Week 5	Host Factors and Susceptibility
Week 6	Public health strategies to reduce host susceptibility
Week 7	Environmental Factors and Disease Transmission
Week 8	Outbreak Investigation and Management
Week 9	Public Health Interventions and Control Measures
Week 10	Antimicrobial therapies and prophylaxis
Week 11	Emerging and Re-emerging Infectious Diseases
Week 12	Global Health and Disease Transmission

Week 13	Future directions and innovations in global health and disease prevention
Week 14	Seminar
Week 15	**Exam**
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Infectious Disease Epidemiology: Theory and Practice" by Kenrad E. Nelson and Carolyn Masters Williams	No
Recommended Texts		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
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

University Name: AlKarkh University of Science

Module Information معلومات المادة الدراسية					
Module Title	Quality control			**Module Delivery**	
Module Type	**core**			☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code	EHS48048				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	**4**		**Semester of Delivery**	**8**	
Administering Department	Environmental health science		**College**	Energy and Environmental Sciences	
Module Leader			**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**	PhD	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**		

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**Lectures**: Traditional lectures can be used to deliver foundational knowledge on conductive polymers, their properties, and applications. Lectures can also include discussions on historical developments and key concepts. **Case Studies**: Case studies can be used to explore real-world applications of conductive polymers. Students can analyze and discuss the challenges, opportunities, and outcomes of specific projects or industry collaborations, allowing them to gain insights into practical applications. **Group Discussions and Debates**: Group discussions encourage active participation and critical thinking. Students can engage in debates on topics such as the future of conductive polymers, ethical considerations, or emerging applications. This promotes collaborative learning and develops communication skills. **Problem-Based Learning**: Students can be presented with open-ended problems or scenarios related to conductive polymers. They can work in groups to analyze the

	problem, propose solutions, and present their findings. This fosters analytical thinking and problem-solving skills. **Research Projects**: Assigning research projects to students allows them to explore specific aspects of conductive polymers in depth. They can conduct literature reviews, design experiments, and analyze data, contributing to the advancement of knowledge in the field. **Online Resources and Virtual Tools**: Utilizing online resources, digital simulations, and virtual tools can enhance learning. These resources can provide interactive demonstrations, virtual experiments, and supplementary materials for self-paced learning. **Presentations and Poster Sessions**: Assigning presentations or poster sessions allows students to communicate their research findings or assigned topics effectively. This develops their presentation skills, promotes peer learning, and encourages critical evaluation of information. **Formative and Summative Assessments**: Regular formative assessments, such as quizzes or group projects, can help monitor students' progress. Summative assessments, such as examinations or research reports, evaluate students' understanding and mastery of the curriculum.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)**	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	**Unstructured SWL (h/w)**	
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)		
	Assignments	2	10% (10)		
	Projects	1	10% (10)		
	Report	1	10% (10)		

Summative assessment	**Midterm Exam**	2 hr	10% (10)		
	Final Exam	2hr	50% (50)		
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Quality Control
Week 2	Quality Management Systems
Week 3	Statistical Process Control (SPC)
Week 4	Sampling Techniques
Week 5	Measurement Systems Analysis
Week 6	Failure Mode and Effects Analysis (FMEA)
Week 7	Root Cause Analysis
Week 8	Quality Improvement Tools
Week 9	Design of Experiments (DOE)
Week 10	Supplier Quality Management
Week 11	Quality Auditing
Week 12	Continuous Improvement
Week 13	Quality in Different Industries
Week 14	Cost of Quality
Week 15	**Exam**
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts		No
Recommended Texts		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 Information

معلومات المادة الدراسية

Module Title	Serology and vaccines	**Module Delivery**	
Module Type	**core**	☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	EHS48049		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	**4**	**Semester of Delivery**	**8**
Administering Department	Environmental health science	**College**	Energy and Environmental Sciences
Module Leader	Dr. zahraa jaafar jameel	**e-mail**	Dr.zahraa.j@kus.edu
Module Leader's Acad. Title	Assistant prof.	**Module Leader's Qualification**	PhD
Module Tutor		**e-mail**	
Peer Reviewer Name		**e-mail**	
Scientific Committee Approval Date		**Version Number**	

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims	This course offers a thorough exploration of serology and vaccines, emphasizing their role in medical diagnostics and public health. Students will learn about the principles

أهداف المادة الدراسية	of antibody-antigen interactions, various serological techniques, the history and development of vaccines, and the impact of vaccination programs on global health. Through lectures, hands-on laboratory exercises, and case studies, students will gain practical knowledge and skills in serological testing and vaccine science.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	49. Understand the fundamental concepts of serology and immunology. 50. Describe the structure and function of antibodies and antigens. 51. Explain the principles and applications of various serological techniques. 52. Discuss the history, development, and types of vaccines. 53. Analyze the mechanisms of action and efficacy of vaccines. 54. Evaluate the impact of vaccination on individual and public health. 55. Develop practical skills in performing serological tests and vaccine-related experiments.
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
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Student Workload (SWL) الحمل الدراسي للطالب			
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Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	**Unstructured SWL (h/w)**	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)		
	Assignments	2	10% (10)		
	Projects	1	10% (10)		
	Report	1	10% (10)		
Summative assessment	**Midterm Exam**	2 hr	10% (10)		
	Final Exam	3hr	50% (50)		
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Serology
Week 2	Serological Techniques and Methods
Week 3	Antibody Production and Detection
Week 4	**Serology test**
Week 5	Introduction to Vaccines
Week 6	Vaccine Development and Regulation
Week 7	Types of vaccines
Week 8	Vaccination and Public Health
Week 9	Vaccine Safety and Adverse Effects
Week 10	Serological and Vaccine Applications in Infectious Diseases
Week 11	Serological and Vaccine Applications in Infectious Diseases2
Week 12	New vaccine technologies and platforms
Week 13	Personalized vaccines and precision medicine
Week 14	Seminar
Week 15	**Exam**
Week 16	**Preparatory week before the final Exam**

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

Required Texts	"Essential Immunology" by Peter J. Delves, Seamus J. Martin, Dennis R. Burton, Ivan M. Roitt	No
Recommended Texts		No
Websites		

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