

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Chemistry	Module Delivery	
Module Type	Basic	<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code	UOW121		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	UGx1 UGI	Semester of Delivery	2
Administering Department	OGE	College	Engineering
Module Leader	Ahmed Adnan	e-mail	Email:Rana.A.Azeez@uotechnology.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D
Module Tutor	NA	e-mail	E-mail
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	01/11/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	<p>Principles of Chemistry is a course designed to provide a general chemistry background to environmental studies majors. Chemistry is a rapidly growing field and is essential in understanding our natural environment. Having a basic knowledge on the atom and its structure, the way atoms connect to form molecules, the properties of chemical substances and the way they react helps students understand the science in their everyday life and provides an essential background and tool for students. Additionally, it provides knowledge of organic substances and compounds - that is, those that contain carbon in their molecular structure, along with other elements such as hydrogen, nitrogen, oxygen, and sulfur.</p> <p>As well as, it will provides with the principles of green technologies and a deep understanding of sustainability issues that will lead to the reduction or elimination of hazardous substances involved in the design, manufacture and application of chemical products. Also examine the environmental, economic and social benefits arising from the transformation of the chemical industries of the future.</p>
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<p>1-Know the fundamentals of the physical and chemical properties of matter, and explain the theoretical principles and important applications of classical analytical methods.</p> <p>2-Classify and give the nomenclature of organic compounds , and explain in details the qualitative and quantitative aspects of organic compounds</p> <p>3-Students will be able to explain why chemistry is an integral activity for addressing economic, and environmental problems.</p>
Indicative Contents المحتويات الإرشادية	<p>Indicative content includes the following:</p> <p>Part I: General Chemistry</p> <p>In this part explains that the chemistry is the branch of science that deals with the properties, composition, and structure of elements and compounds, how they can change, and the energy that is released or absorbed when they change</p> <p>Part II : Analytical Chemistry</p> <p>In this part It is designed to provide a basic overview of analytical chemistry, as a field responsible for characterizing the composition of matter, in qualitative terms (what is there) and Quantitatively (how much is present). Nearly all chemists routinely make qualitative or quantitative measurements.</p> <p>Part III. Organic Chemistry</p> <p>In this part II is designed to provide a fundamental overview of organic chemistry to students interested in pursuing a career in the sciences. It is focusing primarily on the basic principles to understand the structure, properties, composition, and preparation (by Synthesis or by other means) of Carbon-based compounds, Hydrocarbons, and their derivatives. These compounds may contain any number of other elements, including</p>

	<p>Hydrogen, Nitrogen, Oxygen, the Halogens as well as Phosphorus, Silicon, and Sulfur, and reactivity of organic molecules. Emphasis is on substitution and elimination reactions and chemistry of the alkyl group.</p> <p>Part IV sustainable Chemistry</p> <p>This part it provides an overview of sustainable chemistry and will equip the students with an understanding of how to assess chemical syntheses and processing routes as well as to design sustainable materials and chemicals.</p>
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Learning and Teaching Strategies	
استراتيجيات التعلم والتعليم	
Strategies	Teaching and learning strategies can include a range of whole class, group and individual activities to accommodate different abilities, skills, learning rates and styles that allow every student to participate and to achieve some degree of success.

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	90	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation					
تقييم المادة الدراسية					
As		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	5	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	4	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab	1	10% (10)	Continuous	All
	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	
Week	Material Covered
Week 1	What Is Chemistry? Some Basic Definitions Chemistry as a Science
Week 2	Atoms, Molecules, and Ions Atomic Theory Molecules and Chemical Nomenclature Masses of Atoms and Molecules Ions and Ionic Compounds Acids
Week 3	Chemical Reactions and Equations The Chemical Equation Types of Chemical Reactions: Single- and Double-Displacement Reactions Ionic Equations: A Closer Look Composition, Decomposition, and Combustion Reactions Neutralization Reactions Oxidation-Reduction Reactions
Week 4	Stoichiometry and the Mole Stoichiometry The Mole The Mole in Chemical Reactions Mole-Mass and Mass-Mass Calculations

Week 5	Analytical Chemistry: Fundamental way of expressing the concentration of solution: -Molality, Normality, Molarity and Tutorial
Week 6	Equilibrium-Constant Expressions Weak acids and base Dissociation Constants for Conjugate Acid / Base Pairs Relationship between K_a and K_b Hydronium Ion Concentration of Solutions of Weak Acids
Week 7	Analytical Methods of Analysis: a-Qualitative Analysis b-Quantitative Analysis Volumetric Analysis (Titrimetric) & Analysis, Acid- Base, Redox, Precipitation, Complex Titration, Methods of Calculation, Titration Curves Gravimetric Analysis Precipitation Reactions, Direct and Indirect Methods of Analysis, K_{sp} . Instrumental Methods of Analysis.
Week 8	Acids and Bases Arrhenius Acids and Bases Brønsted-Lowry Acids and Bases Acid-Base Titrations Strong and Weak Acids and Bases and Their Salts Auto-ionization of Water.
Week 9	Buffer Solutions: Calculating the pH of buffer solutions The Henderson-Hasselbalch Equation Properties of Buffer Solutions The Composition of Buffer Solutions as a Function of pH: Alpha Values Preparation of Buffer
Week 10	Organic Chemistry: Classification of organic compounds: -Aliphatic compounds (Alkane, Alkene, Alkyne) and cycloalkane

	-Aromatic compounds -Functional group: Alkyl halide, Alcohols, Ether, Aldehydes, Ketones, Esters, Carboxylic acids, Thiophen, Disulphide
Week 11	Aromatic Compounds: Structural formula of benzene ring, nomenclature, preparation, properties, chemical reaction, nitration, halogenation -Chemical reaction of Toluene, Xylene, Ethyl benzene, Styrene, Aniline.
Week 12	Hydrocarbons from Petroleum: Fossil Fuels, Refining, Alkanes from Natural Gas, Crude Oil Refining, Fractional Distillation, Cracking, Octane Number
Week 13	Green Chemistry Introduction Pollution Prevention Sustainability/Real world Green Chemistry Renewable energy
Week 14	Preparatory week before the final Exam
Week 15	Final exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Week	Material Covered
Week 1	Introduction of Analytical Chemistry
Week 2	Preparation the standard solutions : Primary standard solution and secondary standard solution
Week 3	Volumetric Analysis: Titration of hydrochloric acid with sodium carbonate
Week 4	Titration of Mixture (base strong and base weak) with acid strong
Week 5	Acidity of Vinegar, Quiz
Week 6	Introduction of Organic chemistry

Week 7	Measurements the physical properties of organic compounds: Boiling point
Week 8	Measurements the physical properties of organic compounds: Melting point
Week 9	Simple Distillation, Quiz
Week 10	Preparation of organic compounds (ester)
Week 11	Identification of functional groups :Saturated and Unsaturated Aliphatic Compound.
Week 12	Identification of functional groups :Aldehyde and ketone
Week 13	Final Examination Lab

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Text book : R.T. Morrison, R.N. Boyd and S.K. Bhattacharjee; "Organic Chemistry" 7th edition, Prentice Hall of India, copy right 2011.	Yes
Recommended Texts	<p>1) R.T. Morrison and R.N. Boyd; "Organic Chemistry" 6th edition Prentice. Hall . Inc, New Jersey (1992).</p> <p>2) K.S. Tewari, S.N. Mehrotra and N.K., Vishnoi; A Text book of Organic Chemistry, Vikas, Pub . Ltd, New Delhi (1979).</p> <p>3) Douglas A. Skoog, Donald M. West, F. James Holler and Stanley R. Crouch, "Fundamental of Analytical Chemistry", ninth editions, Brooks/cole, 2014 .</p> <p>4)ary D. Christian, Purnendu K. (Sandy) Dasgupta and Kevin A. Schug, "Analytical Chemistry", Seventh edition, John Wiley & Sons, Inc,2014.</p>	Yes
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.