Ministry of Higher Education and Scientific Research
Supervision and Scientific Evaluation Authority
Department of Quality Assurance and Academic Accreditation

Academic Program Description Form for Colleges and Institutes
Academic Year

University: Shatt Al-Arab
College/Institute: Engineering
Scientific Department: Civil
Date of Form Completion: 01/09/2024

Signature
Name of Head of Department:

Asst. Lecturer Nabeel Najm Abdullah

Signature

Name of Scientific Assistant: Dr. Jawad Kadhim

Reviewed by:
Quality Assurance and University Performance Division
Name of Division Director: Dr. Jasem Mohsen Yasser

Signature:

الدكتور
جاسم محسن ياسر
Dr.Jasim Al-Battat

أ.م.د. احسان قاسم محمد
عميد كلية الهندسة

Dean's Approval

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**CHEMISTRY**			**Module Delivery**	
Module Type	**Core**			☑ **Theory** ☑ **Lecture** ☑ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CE126**				
ECTS Credits	**3**				
SWL (hr/sem)	**45**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Mohammed Mustafa Mohammed Nooruldin Ars		**e-mail**		
Module Leader's Acad. Title	Ass. Lecturer		**Module Leader's Qualification**	M. Sc.	
Module Tutor			**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/09/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الاخرى

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الارشادية

Module Aims أهداف المادة الدراسية	The course aims to present the basic methods for interpreting the behaviour of various types of materials in terms of their chemical compositions. Emphasis was placed on the application of chemical principles and their relationship to civil engineering.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Discuss how engineering involves chemistry 2. Summarize Chemistry applications in Building Materials (Examples) 3. Identify the structure of materials. The concept and structure of matter 4. Recognize Cement chemistry. its manufacture, reaction with water and setting to form a solid used in almost all structures. 5. Discuss how to produce cement limestone and clay and to react at high temperatures. The individual elements Ca, Si, O, Al, Fe rearrange themselves to form reactive cement. When mixed with water this cement will harden to become hydrated or hardened cement. 6. Identify the Chemical Composition of Cement 7. Identify burning process : chemical reactions in rotary Klin Zones 8. Discuss the sequence of changes during setting and hardening 9. Identify Setting and Hardening : Chemical Reactions 10. Discuss the Classification of Cements 11. Identify the Green cement and its different types. 12. Recognize Corrosion of Concrete Reinforcement – Causes & Remedies 13. Discuss the Factors Influencing Corrosion of Reinforcement 14. Discuss the Remedial Measures To Protect Reinforcement From Corrosion 15. Recognize water chemistry for better selection of suitable sources of water for human consumption and for livestock. 16. Discuss Water Quality Characteristics. 17. Identify Physical Characteristics of Water
Indicative Contents المحتويات الارشادية	

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Indicative content includes the following. Chemistry importance fundamental, engineering involves chemistry in the following manners, chemistry applications in building materials (examples) the life cycles of all buildings are limited, chemical influences, the structure of materials. the concept and structure of matter[4 hrs] Cement chemistry, Portland cement chemical component, raw materials of portlandcementandit'suse,manufacturingcement,burningprocess: view of complete setup grinding and packaging, burning process : chemical reactions in rotary klin zones, [6 hrs] Properties of cement : setting and hardening, setting and hardening : chemical reactions, classification of cement based on chemical composition, portland cement types, special types of cement, green cement, some types of green cement [7 hrs] Corrosion chemistry, corrosion of concrete reinforcement – causes & remedies, factors influencing corrosion of reinforcement, remedial measures to protect reinforcement from corrosion . [4Hrs] Water chemistry. water quality characteristics, physical characteristics of water, chemical characteristics of water, inorganic minerals , major cations, major anions, carbonate equilibrium, ph and alkalinity, acidity, inorganic indicators of water quality, hardness, total dissolved solids, conductivity, sodium adsorption ratio, [6 hrs] Radionuclides, organic materials, natural organic matter, man-made organics, measurement of organics in water - organic carbon, organic indicators of water quality, biological oxygen demand, chemical oxygen demand, dissolved gases, solubility of gases, dissolved oxygen, microbiological characteristics, biological characteristics of water [6 hrs]

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**	2hr	10% (10)		
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction - Chemistry importance for Engineering
Week 2	The structure of materials. the concept and structure of matter.
Week 3	Cement chemistry, burning process : chemical reactions in rotary klin zones.
Week 4	Setting and hardening : chemical reactions.
Week 5	Classification of cement based on chemical composition
Week 6	Green Cement
Week 7	Mid-term Exam
Week 8	Corrosion chemistry
Week 9	Remedial measures to protect reinforcement from corrosion
Week 10	Water chemistry
Week 11	Carbonate Equilibrium, pH and Alkalinity, Acidity,.
Week 12	Inorganic indicators of water quality, hardness, total dissolved solids, conductivity, sodium adsorption ratio,
Week 13	Radionuclides, organic materials, natural organic matter, man-made organics, measurement of organics in water - organic carbon.
Week 14	Organic indicators of water quality, biological oxygen demand, chemical oxygen demand, dissolved gases, solubility of gases, dissolved oxygen, microbiological characteristics, biological characteristics of water
Week 15	Preparatory Week
Week 16	**Preparatory week before the final Exam**

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Cement and Concrete Chemistry, Wieslaw Kurdowski, Springer Water Chemistry Green Science and Technology of Nature's Most Renewable Resource , S. E. Manahan, CRC press	Yes
Recommended Texts	Chemistry of Water, Rao, Rao Alla Appa, New Age International (P) Limited	No
Websites	https://chem.libretexts.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.