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	**Concrete technology**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CE216**				
ECTS Credits	**8**				
SWL (hr/sem)	**120**				
Module Level	2		**Semester of Delivery**	2	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Ihsan Qasim		**e-mail**		
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	01/09/2024		**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 والمحتوياتالإرشادية

Module Aims أهداف المادة الدراسية	This Module aims at helping students: 1. To develop an understanding about the fundamentals of concrete technology. 2. To be aware of concrete historical development, general characteristics, types, and factors influencing Concrete properties. 3. To discuss and understand the materials involved in making Concrete. 4. Studying the concrete at its Fresh Stage including its design, estimation of material proportions as well as manufacturing, delivery, placing and curing. 5. Study the concrete at it Hardened stage including understanding concepts such as Shrinkage and Creep as well as Durability of concrete. 6. To understand the various laboratory tests required to be done for the concrete at various stages of its development.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of this module, students should be able to exhibit the following key learning outcomes of this module: 1. Recall key historical stages of concrete development over the centuries. Discuss and list concrete types, characteristics and factors influencing its properties. 2. Define and list the various types of cementitious binders. Explain the process of manufacturing Portland cement and its chemical composition. 3. Explain the hydration process of Portland cement and define Portland cement types. 4. Explain the effect of aggregate on concrete and classify the various types of aggregates. Discuss and explain the properties of aggregates. 5. Calculate the various moisture conditions of aggregate moisture content, fineness modules and Bulk specific gravity. Discuss the characteristics of water used in concrete. 6. Define the workability of fresh concrete and explain its method of measurement, segregation, bleeding and list the factors affecting workability of concrete. 7. Explain and carry out the relevant calculations for concrete mix design using both the American and British methods. 8. Discuss the manufacturing process of concrete and explain the key factors to be considered during the delivery and placing of concrete. 9. Discuss the Hardened stage of Concrete including explaining key topics such as strengths of Hardened Concrete, Dimensional Stability—Shrinkage and Creep, Durability as well as non-destructive tests.

Indicative Contents المحتويات الإرشادية	Indicative content includes the following: 1. Introduction to Concrete Concrete Definition and Historical Development, Concrete as a Structural Material, Characteristics of Concrete, Types of Concrete, Factors Influencing Concrete Properties. 2. Materials for Making Concrete Cementitious Binders, Aggregates, Admixtures and Water 3. Fresh Concrete
	Workability of Fresh Concrete, Mix Design, Procedures for Concrete Mix Design, Manufacture of Concrete, Delivery of Concrete, Concrete Placing, Early-Age Properties of Concrete. 4. Hardened Concrete Strengths of Hardened Concrete, Dimensional Stability—Shrinkage and Creep, Durability, Nondestructive tests

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 type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ 15 اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	100	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب اسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	75	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب اسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	15% (15)	4, 13	LO # 2, 3, 4, 5 and 7
	Assignments	2	8% (8)	3, 9	LO # 1 and 6
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	7% (7)	14	LO # 7, 8 and 9
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1 to 5
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Concrete Definition and Historical Development, Concrete as a Structural Material, Characteristics of Concrete, Types of Concrete and Factors Influencing Concrete Properties.
Week 2	Cementitious Binders: Classification of binders, Portland cement, Manufacture of Portland cement, Chemical composition, Hydration of Portland cement
Week 3	Cementitious Binders: Types of Portland cement, The role of water, Basic tests of Portland cement, Geopolymers
Week 4	Aggregates: Effects of aggregates, Classification of aggregates, Properties of aggregates, Moisture conditions, Moisture content (MC) calculations, Density and specific gravity, Unit weight,
Week 5	Measurement of moisture content, Grading aggregates, Shape and texture of aggregates. Solved examples for Moisture content (MC) calculations.
Week 6	Admixtures: Definition and classifications, Chemical admixtures, Air-entraining admixtures, Mineral admixtures. Water: Mixing water, Impurities in water, Water for curing and washing.
Week 7	Midterm Exam Workability of fresh concrete, Segregation and bleeding, slump loss.

Week 8	Introduction to Mix Design. Procedures For Concrete Mix Design using the American Institute of Concrete method
Week 9	Solved Examples for American method for concrete Mix design.
Week 10	Procedures For Concrete Mix Design using the British Standards Institute.
Week 11	Solved Examples for British method for concrete Mix design.
Week 12	Manufacture of Concrete. Delivery of Concrete. Concrete Placing: Site preparation, conveying concrete, Depositing concrete in forms, Compacting and finishing, Curing. Early-Age Properties of Concrete
Week 13	Strengths of Hardened Concrete: Definitions, Compressive strength, and corresponding tests.
Week 14	Uniaxial tensile strength and corresponding tests, Flexural strength and corresponding tests, Bond strength.
Week 15	Shrinkage and Creep, Durability. Non-destructive tests
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Fineness of Cement measurement: Method 1 & 2: Blaine Air Permeability & Sieve Analysis.
Week 2	Lab 2: Determination of Standard Consistency of Cement.
Week 3	Lab 3: Initial and Final Setting Time of Cement.
Week 4	Lab 4: Portland Cement Compressive and Tensile Strength: Casting stage.
Week 5	Lab 5: Portland Cement Compressive and Tensile Strength: Testing Stage.
Week 6	Lab 6: Standard Test Method for Relative Density (Specific Gravity) and Absorption of Fine Aggregate.
Week 7	Lab 7: Standard Test Method for Relative Density (Specific Gravity) and Absorption of Coarse Aggregate.
Week 8	Lab 8: Sieve Analysis of Fine and Coarse Aggregate Test.
Week 9	Lab 9: Slump Test for Concrete.

Week 10	Lab 10: Compaction Factor Test for Concrete
Week 11	Lab 11: Compressive and Tensile Strength Test for Concrete
Week 12-14	For Students to Carry out the relevant tests to complete their Module report.
Week 15	Practical Exam

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Zongjin Li. Advanced Concrete Technology. Advanced Concrete Technology, Published by John Wiley & Sons, Inc.	No
Recommended Texts		No
Websites		

Grading Scheme
مخطط الدرجات

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