	Ministry of Higher Education and Scientific Research - Iraq University of Warith Al-Anbiyaa College of Engineering Civil Engineering Department	

MODULE DESCRIPTOR FORM

Module Information				
Module Title	CONCRETE TECHNOLOGY I		**Module Delivery**	
Module Type	Core		**Theory**	
Module Code	CIV034		**Lecture**	
ECTS Credits	5		**Lab**	
SWL (hr/sem)	**125**			
Module Level	**3**	**Semester of Delivery**	1	
Administering Department	Civil Engineering	**College**	Engineering	
Module Leader	Abdulrasool Thamer Abdulrasool	**e-mail**	abdulrasool.th@uowa.edu.iq	
Module Leader's Acad. Title	Assist Lecturer	**Module Leader's Qualification**	Msc.	
Module Tutor		**e-mail**		
Peer Reviewer Name		**e-mail**		
Scientific Committee Approval Date	2024/9/26	**Version Number**	1	

Relation With Other Modules			
Prerequisite module	None	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Aims	1. The course aims to introduce students to the ability to deal with concrete as a construction material. 2. Graduates of the department should have a comprehensive knowledge of concrete and the raw materials that make it up. 3. Graduate engineers who have the ability to design concrete mixes. 4. Gradate engineers who have sufficient knowledge to make all the tests of fresh and hardened concrete. 5. Students should know about all the Iraqi and international standards, and evaluate the results of laboratory tests.
Module Learning Outcomes	1. The student will be familiar with the most important methods used in the cement industry. 2. The student will be familiar with the factors that affect the properties of the different types of cement and all the details of cement. 3. The student will be familiar with the types of aggregates involved in the production of concrete and its properties. 4. The student will be familiar with the methods of concrete mix design. 5. The student will know the properties of concrete in fresh and hardened states. 6. The student will be familiar with the tests of cement, aggregate, fresh and hardened concrete
Indicative Contents	Indicative content includes the following. Definition of Cement: Portland cement is the name given to a cement obtained by intimately mixing together calcareous and argillaceous, or other silica-, alumina-, and iron oxide bearing materials, burning them at a clinkering temperature, and grinding the resulting clinker. Manufacture of Portland cement: •Calcareous material – such as limestone or chalk, as a source of lime (Cao). • Clayey material – such as clay or shale (soft clayey stones), as a source of silica and alumina. Methods of cement manufacturing: 1 - Wet process: grinding and mixing of the raw materials in the existence of water.

	2 - Dry process: grinding and mixing of the raw materials in their dry state. Chemical Composition of Cement: The silicates, C3S and C2S, are the most important compounds, which are responsible for the strength of hydrated cement paste. Hydration of cement: It is the reaction (series of chemical reactions) of cement with water to form the binding material. In other words, in the presence of water, the silicates (C3S and C2S) and aluminates (C3A and C4AF) form products of hydration which in time produce a firm and hard mass. Types of Cement: •Ordinary Portland cement - Type I • Modified cement - Type II • Rapid-hardening Portland cement - Type III • Low heat Portland cement - Type IV • Sulfate-resisting Portland cement - Type V Aggregate: **Coarse aggregate**: Aggregates predominately retained on a No. 4 (4.75 mm) sieve with percent of (95-100%), are classified as coarse aggregate. **Fine aggregate** (sand): Aggregates passing through a No. 4 (4.75 mm) sieve with percent of (95-100%), and predominately retained on a No. 200 (75 µ m) sieve are classified as fine aggregate. .

Learning and Teaching Strategies	
Strategies	The student acquires the skill of differentiating between the different types of cement, as well as the different types of aggregates involved in the production of concrete. The student acquires the skill of identifying the methods of producing concrete, methods of dealing with it on the site, and the problems facing concrete in hot weather. Also, the student will Know the skill of concrete mix design.

Student Workload (SWL)			
Structured SWL (hr/sem)	63	**Structured SWL (h/w)**	4
Unstructured SWL (hr/sem)	62	**Unstructured SWL (h/w)**	4
Total SWL (h/sem)	125		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	5% (5)	5 and 10	LO #1, #2 and #3, #4
	Assignments	2	5% (5)	2 and 12	LO #5, and #6
	Projects / Lab.	1	15% (10)	Continuous	All
	Report	1	5% (5)	13	LO #1, #2 and #3, #4
Summative assessment	Midterm Exam	2hr	20% (20)	7	LO #1 - #3
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	PORTLAND CEMENT
Week 2	Chemical Composition of Cement
Week 3	Hydration of cement
Week 4	Soundness of cement
Week 5	Test of Fineness
Week 6	Structure of hydrated cement , Types of Cement
Week 7	MID TERM EXAM
Week 8	Pozzolanic Cement Production
Week 9	AGGREGATE
Week 10	Classification of aggregates

Week 11	Mechanical Properties of Aggregate
Week 12	Bulking of Aggregate
Week 13	Admixtures: admixtures, types, necessity and benefit Mineral Admixture, Chemical admixtures - Accelerator, retarder, water reducing elements, plasticizer and
Week 14	super-plasticizer, their functions and dosage.
Week 15	Admixtures: Mineral admixture - Fly ash, silica fume, blast furnace slag, and other pozzolanic materials.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
Week 1	Test Of Cement: Test Method for Consistency of the Cement
Week 2	Test Of Cement: Test Method for Setting Time of the Cement
Week 3	Test Of Cement: Compressive Strength of Cement Mortars
Week 4	Test Of Coarse Aggregate: Quartering Dividing Method for Aggregate
Week 5	Test Of Coarse Aggregate: Riffling Dividing Method for Aggregate
Week 6	Test Of Coarse Aggregate: Sieve Analysis for Fine Aggregate
Week 7	Test Of Coarse Aggregate: Sieve Analysis for Coarse Aggregate
Week 8	Test Of Coarse Aggregate: Clay and Fine Materials Content
Week 9	Test Of Coarse Aggregate: Abrasion Test Method by Using Los Angeles Machine
Week 10	Test Of Coarse Aggregate: Aggregate Impact Test
Week 11	Test Of Coarse Aggregate: Elongation Index
Week 12	Test Of Coarse Aggregate: Flakiness Index
Week 13	Test of Coarse Aggregate: Specific Gravity, Water Absorption and Natural Course of Fine & Course Aggregate.
Week 14	Test of Coarse Aggregate: Course and Compacted Bulk Density and Voids of Fine & Course Aggregate.
Week 15	LAB EXAM

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	Concrete Technology	Yes
Recommended Texts	Properties of concrete by A.M. Neville. Concrete technology by A.M. Neville and Brook J.J 2nd Edition.	No
Websites	https://www.cement.org/learn/concrete-technology	

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.