

Module (Course Book) 2023-2024

College/ Institute	Erbil Technical College	
Department	Civil Engineering Department	
Module Name	CONCERTE TECHNOLOGY	
Module Code	CT 305	
Degree	Technical Diploma <input type="checkbox"/>	Bachler <input checked="" type="checkbox"/>
	High Diploma <input type="checkbox"/>	Master <input type="checkbox"/> PhD <input type="checkbox"/>
Semester	Second stage – Third semester	
Qualification	B.Sc.	
Scientific Title	Engineer	
ECTS (Credits)	6.0 x 27	
Module type	Prerequisite <input type="checkbox"/>	Core <input checked="" type="checkbox"/> Assist. <input type="checkbox"/>
Weekly hours	4	(160)Total hrs Workload
Weekly hours (Theory)	(2)hr Class	
Weekly hours (Practical)	(2)hr Class	
Number of Weeks	20	
Lecturer (Theory)	RAFAH RASHEED ABDULMAJEED TWANA ALI OMAR	
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Course Book

Course Description	<p><u>Theoretical Part</u> Multi methods would be used to transfer the information to the student's mind, wherein at the beginning of the lecture (Theoretical part), the slides would be presented on a large screen using Data Show. It is possible that slides contain writings, pictures, figures and tables to clarify the subject. During the presentation of slides, it would be explained by the lecturer on a white board. At that time student can prepare his question if it is required, it is preferable for the student to ask when the lecturer finished the explanation. Discussion also probable when there is enough time at the end of the lecture between the lecturer and student</p> <p><u>Experimental part:</u></p> <p>Students are required to be present in concrete Lab. All the tests related to concrete and its constituents. A new test will be carried out for every week under the supervising Lecturer and Engineer of the subject in concrete Lab. Students are required to submit their datasheets with the results and calculations required at the end of each test. The total effort of the year will be on 10 Marks. Two examinations (5 marks) will be carried out in the Lab. and (5 marks) on the student's activities during the tests.</p> <p>Final Examination: This is final examination will be carried out theoretically, the total mark on the questions which include both theoretical and practical part will be converted to 50%. The final grade of student will be based on the sum of total effort mark and final examination mark. Distribution of the marks based on the following criteria shown in the table below.</p>
Course objectives	<p><u>Theoretical Part</u> Multi methods would be used to transfer the information to the student's mind, wherein at the beginning of the lecture (Theoretical part), the slides would be presented on a large screen using Data Show. It is possible that slides contain writings, pictures, figures and tables to clarify the subject. During the presentation of slides, it would be explained by the lecturer on a white board. At that time student can prepare his question if it is required, it is preferable for the student to ask when the lecturer</p>

	<p>finished the explanation. Discussion also probable when there is enough time at the end of the lecture between the lecturer and student</p> <p><u>Experimental part:</u></p> <p>Students are required to be present in concrete Lab. All the tests related to concrete and its constituents. A new test will be carried out for every week under the supervising Lecturer and Engineer of the subject in concrete Lab. Students are required to submit their datasheets with the results and calculations required at the end of each test. The total effort of the year will be on 10 Marks. Two examinations (5 marks) will be carried out in the Lab. and (5 marks) on the student's activities during the tests.</p> <p>Final Examination: This is final examination will be carried out theoretically, the total mark on the questions which include both theoretical and practical part will be converted to 50% .The final grade of student will be based on the sum of total effort mark and final examination mark. Distribution of the marks based on the following criteria shown in the table below.</p> <ul style="list-style-type: none"> • 				
Student's obligation	<p>1-Attendance. 2- Completion of all tests. 3-Exams & quizzes. 4- Assignments & reports. 5-Seminar</p>				
Required Learning Materials	<p>During lecturing the data show is used for showing lecture notes using power point program while the white board is used for explanation and solving problems and using concrete laboratory.</p>				
Evaluation	Task		Weight (Marks)	Due Week	Relevant Learning Outcome
	Paper Review		N/A		
	Assignments	Homework	5%	12	1,2,3
		Class Activity	2%	2	1,2,3
		Report	5%	2	1,2,3
		Seminar	5%		
		Essay	N/A		
		Project	N/A	10	1,2,3
	Quiz		8%	2	1,2
	Lab. Reports and Activity		10%	12	4
	Midterm Exam/Theory		10%	1	1,2
	Final Exam/ Theory		20%	1	1;2
	Midterm Exam/Practical		15%	1	4

	Final Exam/ Practical	20%	1	4
	Total	100%		
Specific learning outcome:	<p>Concrete technology is essential for constructing durable and sturdy structures. It allows for the creation of high-quality buildings, bridges, and infrastructure. Concrete provides strength, durability, and resistance to various environmental conditions.</p> <p>It addresses the properties of concrete needed in construction applications, including strength and durability, and provides guidance on all aspects of concrete from mix design to batching, mixing, transporting, placing, consolidating, finishing, and curing.</p> <p>It improves job-site concrete handling, curing, sampling and testing procedures to reduce potential liability to the company.</p>			
Course References:	<ol style="list-style-type: none"> 1. <i>Properties of concrete by A.M. Neville, fourth and final edition (1996)</i> 2. <i>Concrete Technology by J.J. Brook & A.M. Neville, (1990)</i> 3. <i>Concrete Technology (Theory and practice) by M.S Shetty (Reprint -2011)</i> 4. <i>Concrete : Microstructure , properties and Materials by P.K. Mehta and Paulo Monterio (2005)</i> 5. <i>Concrete Materials, properties , Specifications and Testing By Sandor Popovics, Second Edition (1992)</i> 6. <i>Advanced Concrete Technogy , Part-1, II, III, IV by John Newman and B S Choo (2003)</i> 7. <i>Composition and Properties of Concrete by George E. Troxell (1968)</i> <p>تكنولوجيا الخرسانة – تالیف الأستاذ مؤید نوری الخلف – الجامعة التكنولوجی</p>			
Course topics (Theory)	Week	Learning Outcome		
1. Introduction	1	1		
2. Cement Manufactures	2-3	1,2		
3. Cement Composition, Properties& Types of cement	4	1,2		
4. Aggregate Properties	5	1,2		

5. Mix Water Properties	6	1,2
6. Admixtures	7	1,2
7. Concrete	8-9	1,2
8. Fresh Concrete Properties	10-11-12	1,2
9. Hardened Concrete Properties	14-15	1,2
10. ACI Mix design method procedure	16-17-18-19	1,2
11. Concrete In Hot Weather	20	1,2
Practical Topics	Week	Learning Outcome
1. Specific gravity of cement.	1-2	4
2. Standard consistency of water.	3-4	4
3. Setting time of cement.	5-6	4
4. Soundness of cement.	6-8	4
5. Compressive strength of cement	9-10	4
<p>Q1. Fill in the blank with correct answer :-(30M.)</p> <p>1.Clinker is usually in the form of small grey – black pellets about -----mm in diameter.</p> <p>2. The minor compounds which is very few percentages by wet. ----- Of cement is -----, ---- -----,-----,-----.</p> <p>3. Most Portland cement colour effects are due to -----.</p> <p>4. Different types & properties of P.C. can be produced by changing -----&-----.</p> <p>5. Slag is chemically mixture of -----, -----, -----, -----.</p> <p>6. Classification of aggregates according to mineral composition -----, -----, -----</p> <p>7. Specific gravity of aggregate define as three types -----, -----, -----.</p> <p>8. The mineral oil in concrete greater than (----) %by mass of cement may be ----- reduce strength by more than (----)%.</p>		

9.----- material added to cement during it manufactures or where the cement is used to make concrete.

10.Fine aggregate particles smaller than -----mm but larger than ----- μ .

11.The concrete should be discharged at the job site with in -----minute from start of mixing.

12. Tremies for placing concrete -----.

13. Hot weather concreting means -----, -----, -----.

14. ----- is defined as the gradual increase in strain with time under load.

Q2.a. What are means of the absorption, porosity and permeability of aggregates? (12M)

b. What are the sea water & Alkali carbonate effect on the quality of concrete? (8M.).

Q3. Design a concrete mix for the following conditions and constraints using the absolute volume method: -(30M.)

Design Environment A reinforced wall foundation
to be exposed to freezing &thaw, de-icing
chemicals.

Required design strength = 31.15 MPa (28 days
age cube compressive strength Fcu)

Footing dimensions = (6000*1000*300) mm

Minimum space between rebar's = 120 mm

Minimum cover over rebar's = 26 mm

Standard deviation of compressive strength of 2.0 Mpa is expected
(More than 30 samples)

Only air entrained is allowed .

(Turn the pag.)

Available Materials

Cement - High Sulphate resisting Portland Cement S.G.=3.18

Air Entrained

Manufacture specification 7.2 ml / 1% air / 100 kg cement

Coarse aggregates

19mm maximum size , crushed rock
Bulk oven dry specific gravity = 2.68 , Absorption = 0.5 %
Oven dry-rode density = 1600 kg / m³
Moisture content = 2 %

Fine aggregates

Crushed particles.
Bulk oven dry specific gravity = 2.64 , Absorption = 0.7 %
Moisture content = 6 %
Fineness modulus = 2.80

(EXPERIMENTAL PART)

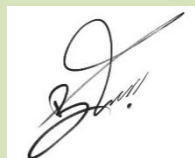
Q1 Find the weight of sample & fineness modulus according the table below:-
(20M)

Sieve size mm	Ret. weight gm	%passing
10	154	94.87
5	--	84.77
2.36	--	71.37
1.18	--	51.80
0.6	--	39.13
0.3	--	22.16
0.15	--	3.56
pan	--	0

Extra notes:

Peer review

As a lecturer I have reviewed the Course Book related to the subject of Construction of Materials for first year, Department of Civil Engineering, College of Technology, I found that the course Book is very good describing the aim and objectives of the subject. Moreover, it is covering all the required syllabus and contents of the course and describes satisfactorily the aspects related to the course.



Dr. Bahman Omar Taha
Lecture
Ph.D. in Structural Engineering.