

Ministry of Higher Education and Scientific research



Department of **Civil Engineering**

College of **Erbil Technical Engineering**

University of **Erbil Polytechnic**

Subject: **Concrete Technology.**

Course Book –Year 1

Lecturer's name: **MSc Rafah Rasheed Abdul majeed**

Academic Year: **2022-2023**

Course Book

Course name	Concrete Technology.
Lecturer in charge	Rafah Rasheed Abdul Majeed.
Department/ College	Civil Engineering Department/Erbil Technical Engineering College
Contact	e-mail: rafah.rasheed@epu.edu.krd
Time (in hours) per week	Theory: 2 Practical: 2
Course code	CT101
Teacher's academic profile	<p>Name: Rafah Rasheed Abdul majeed. Last certificate: M.Sc. Civil Engineering Academic title: Lecturer Specific specialty: Civil Engineering/ Material. Years of experience in teaching: 26 Subjects she teaches now: Concrete Technology and Adv.Concrete Technology. Subjects she had taught previously: Concrete Technology and Adv.Concrete Technology.</p> <p>Language: Kurdish / Arabic / Turkish / English</p>
<p>Course overview: <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>	

Experimental part:

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.

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.

Course objective:

Theoretical Part 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

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Student's obligation

- 1-Attendance.
- 2- Completion of all tests.
- 3-Exams & quizzes.
- 4- Assignments & reports.

Assessment scheme

Breakdown of overall assessment and examination:

Theoretical examination for course	25%
Activity of year	5%
Reports &Seminar	10%
Practical examination for Course	10%
Theoretical examination for final examination	40%
Practical examination for final examination	10%

Course Reading List and References:

1. *Properties of concrete by A.M. Neville, fourth and final edition (1996)*
2. *Concrete Technology by J.J. Brook & A.M. Neville , (1990)*
3. *Concrete Technology (Theory and practice) by M.S Shetty (Reprint - 2011)*
4. *Concrete : Microstructure , properties and Materials by P.K. Mehta and Paulo Monterio (2005)*
5. *Concrete Materials , properties , Specifications and Testing By Sandor Popovics, Second Edition (1992)*
6. *Advanced Concrete Technogy , Part-1, II, III, IV by John Newman and B S Choo (2003)*
7. *Composition and Properties of Concrete by George E. Troxell (1968)*

تكنولوجيا الخرسانة – تأليف الأستاذ مؤيد نوري الخلف – الجامعة التكنولوجية

The Topics:		Lecturer's name
	Introduction	
	Cement Manufactures	
	Cement Composition, Properties & Types of cement	
	Aggregate Properties	
	Mix Water Properties	
	Admixtures	
	Concrete	
	Fresh Concrete Properties	
	Hardened Concrete Properties	
	ACI Mix design method procedure	
	Concrete In Hot Weather	
	Concrete In Cold Weather	
Practical Topics (If there is any)		
<ol style="list-style-type: none"> 1. Specific gravity of cement. 2. Standard consistency of water. 3. Setting time of cement. 4. Soundness of cement. 5. Compressive strength of cement. 		
<p>Examinations:</p> <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 percentage by wet. Of cement is -----,-----,-----,-----,-----.</p> <p>3. Most Portland cement colour effects are due to -----.</p>		

4. Different types & properties of P.C. can be produced by changing ----&----.
5. Slag is chemically mixture of -----,-----,-----,-----.
6. Classification of aggregates according to mineral composition ----,----,-----
7. Specific gravity of aggregate define as three types -----,-----,-----.
8. The mineral oil in concrete greater than (----)% by mass of cement may be reduce strength by more than (----)%.
9. ----- material added to cement during its manufacture 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 within -----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 the 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 F_{cu})
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

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

Lecturer

Ph.D. in Structural Engineering.