

**Civil Engineering Materials**  
SAB 2112

**Introduction to Subject**

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## Introduction

1. This course exposes students to different types of construction materials in civil engineering.
2. It covers type and function of cement, function of aggregates in concrete, water, admixtures, properties of fresh and hardened concrete, concrete mix design, manufacturing concrete on site.
3. Properties and application of timbers, types and characteristics of bricks and blocks, ferrous and non-ferrous metals, and other current materials in the construction industry are also discussed.
4. At the end of the course, students should be able to describe, identify and discuss the properties and behaviour of different types of civil engineering materials, together with the applications of the materials in practice.

## COURSE LEARNING OUTCOMES

No.	Course Learning Outcomes	Assessment Methods
1.	<b>Explain</b> in writing the properties and behavior of different type of civil engineering materials.	T, F
2.	<b>Express</b> and <b>illustrate</b> how the concrete tests are carried out in accordance to relevant standards.	T, F
3.	<b>Select</b> the right type of materials to be used for different application in practice.	T, F
4.	<b>Find</b> up-to-date information relating to the subject.	A

Note : (T – Test ; PR – Project ; Q – Quiz; HW – Homework ; A – Assignment; Pr – Presentation; F – Final Exam)

## STUDENT LEARNING TIME

No.	Teaching and Learning Activities	Student Learning Time (hours)
1.	Face-to-Face Learning	
	a. Lecturer-Centered Learning	
	i. Lecture	28
2.	Self-Directed Learning	
	Non-face-to-face learning or student-centered learning	
	a. (SCL) such as manual, assignment, module, e-Learning, etc.	22
	b. Revision	15
	c. Assessment Preparations	10
3.	Formal Assessment	
	a. Continuous Assessment	3
	b. Final Exam	2
<b>Total (SLT)</b>		<b>80</b>

## Grading & Assessment

No.	Assessment	Number	% each	% total	Dates
1.	Assignments	1	10	10	Week 10
3.	Test 1	1	20	20	Week 6
3.	Test 2	1	20	20	Week 13
4.	Final Exam	1	50	50	Week 17-19
<b>Overall Total</b>				<b>100%</b>	

## CONTENT SCHEDULE – 1<sup>st</sup> Meeting

1. Introduction, cement manufacturing process, types of cement, chemical composition of OPC
2. Hydration of cement, testing of cement, types of aggregates, physical and mechanical characteristics of aggregates
3. Size distribution and testing of aggregates, water in concrete, types of chemical admixtures



### CONTENT SCHEDULE – 2<sup>nd</sup> Meeting

1. Types of pozzolanic admixtures, water-cement ratio and its effect in concrete
2. Workability, test of fresh concrete, segregation and bleeding in concrete
3. Concrete on site - method of production, concrete strength and grade
4. Concrete proportions - standard, nominal; Hardened concrete tests- destructive and non-destructive tests



### CONTENT SCHEDULE – 3<sup>rd</sup> Meeting

1. Timber classification, its structure and moisture content, types of strength, factors affecting the strength of timber
2. Defect in timber and its causes, seasoning and wood preservatives, timber products and their use, types of bricks, blocks and their use
3. **TEST 1**



### CONTENT SCHEDULE – 4<sup>th</sup> Meeting

1. Manufacturing and types of clay bricks, characteristics and testing of bricks
2. Mortar for brickwork, ferrous metal - iron, steel
3. **TEST 2**



### CONTENT SCHEDULE – 5<sup>th</sup> Meeting

1. Types and application of steel in construction
2. Non-ferrous metal - types and characteristics, use of non-ferrous metal in construction
3. Latest construction materials - polymer, glass, composite material, cement based products

#### TEXT BOOK

1. Abdel Kader Ismail, M., Mohd.Sam, A.R., Radin Sumadi, S., Hussin, M.W., and Haron, Z., **Introduction to Civil Engineering Materials**, Second Edition, Mc Graw Hill, 2008

#### REFERENCES


1. Somayaji, S., Civil Engineering Materials, Second Edition, Prentice Hall, 2001
2. Jackson N., Civil Engineering Materials, Macmillan Press Ltd., 1995
3. Neville A. M., and Brooks J. J., Concrete Technology, Longman, 1990
4. Herubbin C. A., and Marotta T. W., Basic Construction Materials, Prentice Hall, 1987
5. Derucher, K. N.; Korfiatis, G. P.; and Ezeldin, A. S., Materials for Civil & Highway Engineers, Fourth Edition, Prentice Hall, 1998



### Attendance

The student should adhere to the rules of attendance as stated in the University Academic Regulation :-

- Student must attend **not less than 80%** of lecture hours as required for the subject.
- The student **will be prohibited from attending** any lecture and assessment activities upon failure to comply the above requirement. **Zero mark** will be given to the subject.

 <b>Contact</b>			
Lecturers	E-Mail	Room No.	Phone No.
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