

MSE4307: BUILDING MATERIALS

Effective Term

Semester A 2025/26

Part I Course Overview

Course Title

Building Materials

Subject Code

MSE - Materials Science and Engineering

Course Number

4307

Academic Unit

Materials Science and Engineering (MSE)

College/School

College of Engineering (EG)

Course Duration

One Semester

Credit Units

3

Level

B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

Nil

Precursors

Nil

Equivalent Courses

AP4307 Building Materials

Exclusive Courses

Nil

Part II Course Details

Abstract

The course aims at covering the basic structure and properties of building materials pertinent to the structural applications. Upon successful completion of the course, students are expected to be equipped with elementary understanding of the

categories, structures and properties of common building materials. They will also be able to recognize the practical considerations of building materials in structural applications.

Course Intended Learning Outcomes (CILOs)

CILOs		Weighting (if DEC-A1 DEC-A2 DEC-A3 app.)			
1	Describe the types, ingredients, and design of concrete and other structural building materials.		x		
2	Explain the factors affecting the durability of concrete.				
3	Select and apply various tests of concrete and other building materials.				
4	Describe the types and function of cladding materials.		x		
5	Select appropriate materials for internal walls, ceilings and partitions.			x	

A1: Attitude

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments

Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Learning and Teaching Activities (LTAs)

LTAs	Brief Description	CILO No.	Hours/week (if applicable)	
1	Lecture	Students will engage in formal lectures to gain knowledge about building materials.	1, 2, 3, 4, 5	3
2	Tutorial	Students will be encouraged to discuss the characteristics and applications of various building materials in daily life examples.	1, 2, 3, 4, 5	1
3	Group project	Students work in groups on self-directed projects relating to properties and applications of building materials in real life situations to consolidate their knowledge in the subject.	3, 4, 5	1

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("- " for nil entry)	Allow Use of GenAI?
1	Mid-term tests	1, 2, 3, 4, 5	20	-	No
2	Group project and two assignments	3, 4, 5	20	-	No

Continuous Assessment (%)

40

Examination (%)

60

Examination Duration (Hours)

2

Minimum Examination Passing Requirement (%)

30

Additional Information for ATs

For a student to pass the course, at least 30% of the maximum mark for the examination must be obtained

Assessment Rubrics (AR)**Assessment Task**

1. Examination

Criterion

Demonstrates understanding of the scientific principles and the working mechanisms; ability to solve relevant engineering problems

Excellent (A+, A, A-)

High

Good (B+, B, B-)

significant

Fair (C+, C, C-)

moderate

Marginal (D)

basic

Failure (F)

Not reaching marginal level

Assessment Task

2. Mid-term tests

Criterion

Demonstrates understanding of the scientific principles and the working mechanisms; ability to solve relevant engineering problems

Excellent (A+, A, A-)

High

Good (B+, B, B-)

significant

Fair (C+, C, C-)

moderate

Marginal (D)

basic

Failure (F)

Not reaching marginal level

Assessment Task

3. Group project

Criterion

Ability to explain in detail and with accuracy methods of inquiry Demonstrate capacity for self-directed learning

Excellent (A+, A, A-)

High

Good (B+, B, B-)

significant

Fair (C+, C, C-)

moderate

Marginal (D)

basic

Failure (F)

Not reaching marginal level

Part III Other Information

Keyword Syllabus

- General introduction to building materials
Types and applications, ingredients of concrete.
- Steel frame construction
Structural steels, standard sections, methods of joining steel structural members, the construction process of steel structure, flooring and roof decking materials, fireproofing of steel framing.
- Cement
Basic chemical compositions, manufacturing processes, chemical reaction (hydration), properties, and types.
- Aggregates
Types, grading, properties.
- Design of concrete mix
Economic, workability, strength, applications.
- Testing of concrete

Testing of plastic properties, destructive, in-situ and non-destructive testing of hardened concrete.

- Durability
Chemical attack, impact, wear, shrinkage, creep, fatigue, thermal attack.
- Admixtures
Categories, properties and characteristics.
- Special concrete
Light weight concrete, high strength concrete, pre-cast concrete, reinforced and pre-stressed concrete.
- Glass
Structure of glass, classification of glass types, strength of glass and toughening methods, glazing.
- Cladding
Functions of cladding, cladding materials, the curtain wall.
- Materials for interior walls, partitions, ceiling and floorings
Fire walls, plaster, gypsum board, functions of ceiling, flooring materials, stone, brick, tiles, wood, synthetic flooring materials.

Reading List

Compulsory Readings

Title	
1	Nil

Additional Readings

Title	
1	""Fundamentals of Building Construction – Materials and Methods", Edward Allen, 2nd ed, John Wiley & Sons, 1990."
2	""Basic Construction Materials" T W Marotta, C A Herubin, 5th ed., Prentice Hall, 1997."
3	“Building Materials in Civil Engineering” , Haimei Zhang, Cambridge: Woodhead Pub., 2011.