MSE4307: BUILDING MATERIALS

Effective Term
Semester A 2023/24

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 app.)	DEC-A1	DEC-A2	DEC-A3
1	Recognize 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	Recognize 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.

Teaching and Learning Activities (TLAs)

	TLAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Lecture		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	3, 4, 5	1

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Mid-term tests	1, 2, 3, 4, 5	20	
2	Group project and two assignments	3, 4, 5	20	

Continuous Assessment (%)

40

Examination (%)

60

Examination Duration (Hours)

2

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 inquiryDemonstrate 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, shinkage, 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."