

MNE3118: MECHANICS OF MATERIALS

Effective Term

Semester A 2025/26

Part I Course Overview

Course Title

Mechanics of Materials

Subject Code

MNE - Mechanical Engineering

Course Number

3118

Academic Unit

Mechanical Engineering (MNE)

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

MNE2109/BME2109 Engineering Mechanics

Precursors

Nil

Equivalent Courses

Nil

Exclusive Courses

Nil

Part II Course Details

Abstract

This course provides basic knowledge of mechanics of solid materials including analysis of stress and strain, axial forces, torsion of a circular shaft and beam bending, etc. It's the fundamental knowledge for mechanical design of versatile engineering products.

Course Intended Learning Outcomes (CILOs)

CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Describe the fundamental concepts of mechanics of materials and their impacts on the behavior of solid materials subject to forces or displacements.		x	
2	Identify the materials related mechanical engineering problems, explain the problems with critical thinking generated from mechanics concepts, and calculate the problems with mechanics theory.		x	
3	Apply the mechanics knowledge to explain structural and functional behavior of solid materials such as metals, ceramics, polymers and composites.		x	x
4	Interpret the experimental results obtained in the laboratory sessions to evaluate the mechanical behavior of solid materials.	x	x	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	This activity includes typical lectures on different topics of mechanics of materials and applications accompanied by in-class student activities.	1, 2, 3	3 hrs/week for 13 weeks

2	Laboratory	Students are asked to work on laboratory exercises on different topics of experimental techniques and applications. They are requested to conduct laboratory experiments on the measurement of materials with different instruments and techniques, and then summarize, discuss and record the results obtained from the experiments.	3, 4	3 hrs/week for 4 weeks
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Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("- " for nil entry)	Allow Use of GenAI?
1	Tests/Assignments	1, 2, 3	20	-	Yes
2	Laboratory Reports	3, 4	20	3-4 reports to be submitted	Yes

Continuous Assessment (%)

40

Examination (%)

60

Examination Duration (Hours)

3

Minimum Continuous Assessment Passing Requirement (%)

30

Minimum Examination Passing Requirement (%)

30

Additional Information for ATs

For a student to pass the course, at least 30% of the maximum mark for both coursework and examination should be obtained.

Assessment Rubrics (AR)**Assessment Task**

Tests/Assignments

Criterion

Describe the fundamental concepts of mechanics and apply them to explain mechanical behavior of solid materials; Analyse and calculate the problems with mechanics theory.

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

Laboratory Reports

Criterion

Attendance of the lab/demo session; ABILITY to EXPLAIN the methodology and procedure and ANALYSE the lab data.

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Assessment Task

Examination

Criterion

Describe the fundamental concepts of mechanics and apply them to explain mechanical behavior of solid materials;
Analyse and calculate the problems with mechanics theory.

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Additional Information for AR

Note: For a student to pass the course, at least 30% of the maximum mark for both coursework and examination should be obtained.

Part III Other Information**Keyword Syllabus**

Tension, Compression and Shear, Axially Loaded Members, Torsion, Shear Forces and Bending Moments, Stresses in Beams, Analysis of Stress and Strain, Plane Stress, Plan Strain, Deflections of Beams, Membranes and Columns, etc.

In addition to the examination and in-class test, students are required to learn through collaborative lab sessions in order to improve their understanding on strategic thinking, problem solving, team working processes, the relationships and interactions between the fields of knowledge that they have learnt in this and other courses.

Reading List**Compulsory Readings**

Title	
1	“Mechanics of materials” , Barry J. Goodno and James M. Gere, 9th ed., SI Version, Cengage Learning, 2018

Additional Readings

Title	
1	R. C. Hibbeler, Mechanics of Materials, 9 ed., Prentice Hall, 2013
2	Crandall, S. H., N. C. Dahl, and T. J. Lardner. An Introduction to the Mechanics of Solids. 3rd ed. Tata McGraw Hill Education Private Limited, 2012
3	Dowling, N. E. Mechanical Behavior of Materials. 4th ed. Prentice Hall, 2012