

# MNE6125: ENGINEERING METHODS

---

## Effective Term

Semester A 2025/26

## Part I Course Overview

### Course Title

Engineering Methods

### Subject Code

MNE - Mechanical Engineering

### Course Number

6125

### Academic Unit

Mechanical Engineering (MNE)

### College/School

College of Engineering (EG)

### Course Duration

One Semester

### Credit Units

3

### Level

P5, P6 - Postgraduate Degree

### Medium of Instruction

English

### Medium of Assessment

English

### Prerequisites

Nil

### Precursors

Calculus and computational coursework of a Bachelor's degree in mechanical/nuclear engineering or equivalent majors

### Equivalent Courses

MNE8108 Engineering Methods

### Exclusive Courses

Nil

## Part II Course Details

### Abstract

The course is to teach advanced knowledge of mathematical and numerical methods for to the students who are seeking a degree of Doctor of Philosophy in the major of mechanical engineering or nuclear engineering. The topics include linear algebra, partial differential equations, data science, basic concepts of numerical methods and so on.

### Course Intended Learning Outcomes (CILOs)

CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Describe the concepts of engineering methods and their impacts on the research and development of mechanical or nuclear engineering.		x	
2	Formulate mechanical/nuclear related equations with proper analytical or numerical methods.	x	x	
3	Identify and implement the proper analytical or numerical method for solving a specific type of engineering problem; recognize the advantages, disadvantages and limitations of the methods.	x	x	
4	Identify and implement the proper method for analysing a specific group of data; recognize the advantages, disadvantages and limitations of the method.	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	Take place in classroom which consists of lectures on different engineering mechanics concepts and applications.	1, 2, 3, 4	2 hrs/week for 13 weeks
2	Tutorial	Take place in classroom which consists of tutorials and student activities on learning different engineering mechanics concepts and applications.	1, 2, 3, 4	1 hr/week for 13 weeks

### Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks ("-" for nil entry)	Allow Use of GenAI?
1	Tests/ Assignments	1, 2, 3, 4	30	-	Yes
2	Mini-project/Lab	1, 2, 3, 4	40	-	Yes

**Continuous Assessment (%)**

70

**Examination (%)**

30

**Examination Duration (Hours)**

2

**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**

Examination (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

**Criterion**

Describe the fundamental concepts of applied 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**

Tests/ Assignments (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

**Criterion**

Describe the fundamental concepts of applied 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**

Mini-project/ Lab (for students admitted before Semester A 2022/23 and in Semester A 2024/25 & thereafter)

**Criterion**

Ability to conduct effective literature survey, analyse the problem with been taught concepts and theories, and demonstrate the idea with a mini-project. Attendance of the lab session; Ability to explain the methodology and procedure and analyse the lab data/phenomena.

**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 (for students admitted from Semester A 2022/23 to Summer Term 2024)

**Criterion**

Describe the fundamental concepts of applied 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) Significant

**Marginal**

(B-, C+, C) Moderate

**Failure**

(F) Not even reaching marginal levels

---

**Assessment Task**

Tests/ Assignments (for students admitted from Semester A 2022/23 to Summer Term 2024)

**Criterion**

Describe the fundamental concepts of applied 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) Significant

**Marginal**

(B-, C+, C) Moderate

**Failure**

(F) Not even reaching marginal levels

---

**Assessment Task**

Mini-project/ Lab (for students admitted from Semester A 2022/23 to Summer Term 2024)

**Criterion**

Ability to conduct effective literature survey, analyse the problem with been taught concepts and theories, and demonstrate the idea with a mini-project. Attendance of the lab session; Ability to explain the methodology and procedure and analyse the lab data/phenomena.

**Excellent**

(A+, A, A-) High

**Good**

(B+, B) Significant

**Marginal**

(B-, C+, C) Moderate

**Failure**

(F) Not even reaching marginal levels

---

## Part III Other Information

**Keyword Syllabus**

Linear algebra, partial differential equations, data science, basic concepts of numerical methods, and so on.

## Reading List

### Compulsory Readings

Title	
1	Lecture notes

### Additional Readings

Title	
1	Students are encouraged to seek out related textbooks and research publication to widen their scope in the subjects.