MNE8108: ENGINEERING METHODS

Effective Term
Semester A 2025/26

Part I Course Overview

Course Title
Engineering Methods

Subject Code
MNE - Mechanical Engineering
Course Number
8108

Academic Unit
Mechanical Engineering (MNE)

College/School
College of Engineering (EG)

Course Duration
One Semester

Credit Units
3

Level
R8 - Research 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
MNE6125 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 must 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

Test/ Assignment (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.

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(A+, A, A-) High

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

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Ability to conduct effective literature survey, analyse the problem with been taught concepts and theories, and demonstrate the idea with a mini-project.
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(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