MNE6116: APPLIED ENGINEERING MECHANICS

Effective Term
Semester B 2024/25

Part I Course Overview

Course Title
Applied Engineering Mechanics

Subject Code
MNE - Mechanical Engineering
Course Number
6116

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
Bachelor level Statics, Dynamics and Mechanics of Materials

Equivalent Courses
MNE8113 Applied Engineering Mechanics

Exclusive Courses
Nil

Part II Course Details

Abstract
The course teaches the students who are seeking a degree of Master of Science advanced knowledge of engineering mechanics and encourage the students to apply more in-depth mechanics principles and theories into research and

development applications. The content includes selected topics such as elasticity and plasticity, viscoelasticity, failure theories, fracture, fatigue and finite element theories, with their applications in metamaterials and soft robots.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Describe the fundamental concepts of engineering mechanics and their impacts on the development of mechanical applications.		x	x	
2	Identify mechanics related mechanical engineering problems and calculate the problems with mechanics theories.			x	
3	Conduct literature survey to a mechanics related research and development problem, analysis the problem with critical thinking generated from the mechanics concepts and demonstrate the idea with a mini-project.			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	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	1 hr/week for 13 weeks

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Test/Assignment	1, 2	30	
2	Mini projects	3	20	

Continuous Assessment (%)

50

Examination (%)

50

Examination Duration (Hours)

2

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/ 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.

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 (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.

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/ 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
(B+, B) Significant

Marginal
(B-, C+, C) Moderate

Failure
(F) Not even reaching marginal levels

Assessment Task
Mini-project (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.

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

Elasticity and plasticity, viscoelasticity, failure theories, fracture, fatigue, finite element theories, metamaterials and soft robots etc.

Reading List

Compulsory Readings

	Title
1	“Mechanics of Materials”, Ferdinand Beer, E. Johnston, John DeWolf and David Mazurek, 8th ed., SI Version, The McGraw-Hill, 2020.
2	“Mechanics of Materials”, Russell Hibbeler, 11th ed., Pearson, 2022.
3	“Applied Mechanics of Solids”, Allan F. Bower, 1st ed., CRC Press, 2009.
4	“Shigley's Mechanical Engineering Design”, Richard G Budynas and Keith J Nisbett, 10th ed., McGraw-Hill Higher Education, 2014.
5	“Fundamentals of Machine Elements”, Steven R. Schmid, Bernard J. Hamrock, Bo. O. Jacobson, 3rd ed., SI Version, CRC Press, 2014.
6	Mechanical Properties of Engineered Materials”, Wolé Soboyejo, 1st ed., CRC Press, 2002.
7	“Materials Science and Engineering”, William D. Callister Jr. and David G. Rethwisch, 9th ed., SI Version, John Wiley & Sons, 2014.
8	“Elasticity”, James R. Barber, 3rd ed., Dordrecht: Springer Netherlands, 2010. On-line version available through CityU library.
9	“Fundamentals of finite element analysis: Linear finite element analysis”, Koutromanos, Ioannis, 1st ed., John Wiley & Sons, 2018.

Additional Readings

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