

# MNE6116: APPLIED ENGINEERING MECHANICS

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## Effective Term

Semester A 2025/26

## 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 ("-" for nil entry) | Allow Use of GenAI? |
|---|-----------------|----------|---------------|-----------------------------|---------------------|
| 1 | Test/Assignment | 1, 2     | 30            | -                           | Yes                 |
| 2 | Mini projects   | 3        | 20            | -                           | Yes                 |

**Continuous Assessment (%)**

50

**Examination (%)**

50

**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/ 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

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**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

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**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

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## 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. |