



## ADVANCED DIPLOMA OF MECHANICAL ENGINEERING TECHNOLOGY

### MODULE DETAILS

#### Module 1: Fundamentals of Mechanical Engineering

Nominal duration: 2 weeks (24 hours total time commitment)

This time commitment includes the preparation reading, attendance at each webinar (1 hour plus 15-30 minutes for discussion), and the time necessary to complete the assignments and further study.

### MODULE PURPOSE

This module introduces the fundamental concepts and applications of Mechanical Engineering. It starts with an introduction to the principles of mechanical drawings such as tolerances, symbols, sections and CAD. This is followed by a discussion on the mechanical behaviour of engineering materials, e.g. stress and strain, fatigue, fracture, creep and corrosion. Practical fundamentals of mechanical design and manufacturing methods are also addressed.

### PRE-REQUISITE MODULES/UNIT(S)

NONE

### ASSESSMENT STRATEGY

To evaluate the achievement of the learning outcomes, written assignments and practical exercises are set.

### SUMMARY OF LEARNING OUTCOMES

1. Apply basic concepts in Mechanical Engineering
2. Describe concepts related to engineering materials
3. Examine and discuss concepts and technologies related to mechanical design
4. Identify the different manufacturing processes for mechanical components

### Learning Outcome 1

#### Apply basic concepts in Mechanical Engineering

### Assessment Criteria

- 1.1. Interpret mechanical drawings and designs
- 1.2. Describe the concept of friction
- 1.3. Examine and discuss the issue of limits and fits in mechanical systems



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| <b>Learning Outcome 2</b>  | <b>Describe concepts related to engineering materials</b>  |
| <b>Assessment Criteria</b> | <ul style="list-style-type: none"><li>2.1. Select appropriate engineering materials on the basis of their properties</li><li>2.2. Describe the various failure modes of engineering materials</li></ul>  |
| <b>Learning Outcome 3</b>  | <b>Examine and discuss concepts and technologies related to mechanical design</b>  |
| <b>Assessment Criteria</b> | <ul style="list-style-type: none"><li>3.1. Outline the basic mechanical design principles</li><li>3.2. Apply the basics of design for static strength using a Factor of Safety</li><li>3.3. Describe the concept of static equilibrium</li><li>3.4. Examine and discuss the use of threaded fasteners, keys and rivets</li><li>3.5. Describe the basics of designing for static strength</li><li>3.6. Describe the basics of fatigue strength and failure</li></ul>  |
| <b>Learning Outcome 4</b>  | <b>Identify the different manufacturing processes for mechanical components</b>  |
| <b>Assessment Criteria</b> | <ul style="list-style-type: none"><li>4.1. Describe the basic concepts related to casting and heat treatment</li><li>4.2. Discuss the basics of hot and cold working of metal</li><li>4.3. Discuss the basics of press work and associated tooling</li><li>4.4. Explain the fundamentals of CNC and CAM</li><li>4.5. Describe different machining and metal cutting operations</li><li>4.6. Outline the basics of shaping, sawing and broaching</li><li>4.7. Describe the fundamental concepts of virtual and physical rapid prototyping</li><li>4.8. Discuss 3D printing technologies</li></ul> |

**Delivery Mode**

A combination of asynchronous and synchronous e-learning delivery comprising a judicious mix of interactive online web conferencing, simulation (virtual labs) software, remote online labs, online videos, PowerPoint slides, notes, reading and study materials (in PDF, HTML and Word format) accessed through the Moodle Learning Management System (LMS).