



ADVANCED DIPLOMA OF MECHANICAL ENGINEERING TECHNOLOGY

MODULE DETAILS

Module 2: Structural Mechanics

Nominal duration: 3 weeks (36 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

Construction is the largest industry in the world and anything constructed needs to be designed first. Structural Engineering deals with the analysis and design aspects, the basic purpose of which is to ensure a safe, functional and economical structure. While designing, the designer constantly interacts with specialists such as architects and operations managers. Once the design is finalized, the implementation requires involvement of people to handle aspects such as statutory approvals, planning, quality assurance and material procurement. The entire exercise can be undertaken in a highly-coordinated way if everyone involved understands the 'project language', which is a combination of designs and specifications. To understand the language fully, it is necessary to appreciate the principles of structural analysis and design. Course participants will gain a basic knowledge of structural engineering.

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. Examine and apply the basic principles of Strength of Materials
2. Apply the basics of structural analysis
3. Examine and discuss structural design philosophies

Learning Outcome 1

Examine and apply the basic principles of Strength of Materials

Assessment criteria

- 1.1. Discuss the effects of tension and compression
- 1.2. Explain the difference between stress and strain
- 1.3. Examine and discuss stress-strain characteristics
- 1.4. Discuss the theory of elasticity
- 1.5. Calculate the properties of common cross-sections



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- 1.6. Distinguish between deflection and deformation

Learning Outcome 2

Apply the basics of structural analysis

Assessment Criteria

- 2.1 Distinguish between determinate and indeterminate structures
- 2.2 Determine stresses in elastic solids using stress functions
- 2.3 Describe the basic procedures for the analysis of:
(a) Statically determinate structures
(b) Statically indeterminate structures
(c) Deformation under loading

Learning Outcome 3

Examine and discuss structural design philosophies

Assessment Criteria

- 3.1 Predict the behaviour of structural members under loading
- 3.2 Outline the fundamentals of:
(a) Working stress design
(b) Limit state design
(c) Loads

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).