



Module Specification

Fundamentals of Mechanical Principles

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Part 1: Information

Module title: Fundamentals of Mechanical Principles

Module code: UFME3H-15-1

Level: Level 4

For implementation from: 2026-27

UWE credit rating: 15

ECTS credit rating: 7.5

College: College of Arts, Technology and Environment

School: CATE School of Engineering

Partner institutions: UCW

Field: Engineering, Design and Mathematics

Module type: Module

Pre-requisites: None

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: This introductory module considers a range of engineering analyses of mechanical principles and solid structures. Examples are set in an industrial context where possible. Otherwise, key learning examples will be utilised. The module covers a range of theories and techniques that are central to the understanding of stress, kinematics and dynamics principles in an engineering context, as well as supporting the theoretical underpinning of mathematical modelling of engineering applications.

Features: Not applicable

Educational aims: The module explores how stress analysis is related to material properties and geometry. Mathematics and numerical modelling techniques are presented in an engineering context in order to build confidence when addressing future design and engineering challenges.

Outline syllabus: Introduction to statics; static equilibrium equations, reactions at supports, distributed and concentrated loading.

Pin-jointed framework; compression and tension. Method of Joints; Method of sections. Frames and machines.

Properties of materials, stress, strain, Young's Modulus.

Shear Force & Bending Moment Theory and application.

Stresses in beams & Second Moment of Area, Parallel axis theorem.

Combined bending and end load.

Thermal Strain & Intro to 2D & 3D theory.

Torsion, derivation of the engineering torsion formula and shear modulus.

Theory of kinematics and dynamics principles supporting engineering applications such as: displacement, velocity and acceleration extended to non-uniform acceleration incorporating numerical methods, projectile motion, tanks, missiles, Newton's laws, work and energy, momentum and force impulse, torque, cooling problems, and mechanical systems.

Part 3: Teaching and learning methods

Teaching and learning methods: Scheduled learning will typically include lectures, lectorials and tutorials intended to be delivered in an interactive way. Learning will be achieved through face-to-face, hybrid or fully virtual processes. Independent learning hours includes engagement with essential reading material and the working through of exercises.

Learning material will be delivered through a set of Lectures combined with Tutorials, where learners apply the knowledge gained. Lectorials will be naturally blended in with the lectures for learners to gain autonomy in the application of learning.

Structured laboratory exercises may be embedded to enhance learning. Students will start by benchmarking their starting point and progress to problem-based learning which will culminate in the design and implementation of a complete system. Accompanying lectures and tutorial sessions will present the formal aspects of the module.

In addition to lecture material, basic familiarisation with software and simulation of static and material science will be embedded in the programme.

Module Learning outcomes: On successful completion of this module students will achieve the following learning outcomes.

MO1 Identify and explain the different fundamental static and dynamic principles governing engineering structures and systems, demonstrating understanding of underpinning physical laws and behaviour.

MO2 Apply appropriate analytical principles, mathematical models, and methods to analyse and solve engineering problems.

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 114 hours

Staff-guided learning = 36 hours

Reading list: The reading list for this module can be accessed at [readinglists.uwe.ac.uk](https://uwe.rl.talis.com/index.html) via the following link <https://uwe.rl.talis.com/index.html>

Part 4: Assessment

Assessment strategy: Students build confidence with applying the fundamental engineering principles of mechanical principles and structural analysis (statics) through an end of semester examination.

Students will have the opportunity to take short practice tests throughout the semester. This is designed to provide regular support and feedback to students as they develop their knowledge and skills in the use of fundamental principles.

The resit assessment has the same profile as the first sit assessment.

Assessment tasks:

Examination (First Sit)

Description: 3 hours PC based on campus examination

Weighting: 100 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2

Examination (Resit)

Description: 3 hours PC based on campus examination

Weighting: 100 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Aeronautical Engineering {Apprenticeship-UCW} [UCW] BEng (Hons) 2026-27

Electro-mechanical Engineering {Apprenticeship-UCW}[UCW] BEng (Hons) 2026-27

Electro-mechanical Engineering {Apprenticeship-UCW}[UCW] BEng (Hons) 2026-27

Electro-mechanical Engineering [UCW] BEng (Hons) 2026-27