Module Specification

Foundation Mechanics

Version: 2025-26, v2.0, Approved

Contents

Part 1: Information

Module title: Foundation Mechanics

Module code: UFMFAG-30-0

Level: Level 3

For implementation from: 2025-26

UWE credit rating: 30

ECTS credit rating: 15

College: College of Arts, Technology and Environment

School: CATE School of Engineering

Partner institutions: None

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: Foundation Mechanics is a module intended to bring the skill level in the general area of physics and mechanics so that the students can have easier transition to the first year of engineering, especially where a higher level of subject is studied under the same theme.
This module focusses on statics, dynamics, fluid dynamics and the required mathematics for those areas of mechanics.

Features: Not applicable

Educational aims: The learning objectives of a Foundational Mechanics module is to typically focus on building a strong understanding of the fundamental principles governing the behaviour of physical systems.
This will involve...
Understand Core Concepts: Grasp the basic principles of mechanics, including Newton's laws of motion, the concepts of force, mass, acceleration, energy, and momentum.
Explore Force and Equilibrium: Understand how forces interact to cause motion or maintain equilibrium, including concepts like friction, tension, normal force, and gravitational force.
Develop Problem-Solving Skills: Gain proficiency in breaking down complex problems, identifying relevant principles, and applying systematic approaches to find solutions.
Interpret Real-World Applications: Connect theoretical concepts to practical scenarios, such as the motion of rigid bodies, fluids, or structural stability in engineering.

Outline syllabus: Triangles: Pythagoras' Theorem; Trigonometric Ratios; Cosine and sine rule; Trigonometry, Graphs and Waveforms; Trigonometrical Identities and other special relationships.

Fundamental Units, Vectors and Scalars. Vectorial Representation and force components.

Static Equilibrium: Newton's 1st and 3rd Laws, force, weight, resultant component. Moments, equilibrium, Centre of gravity, Centre of area. Free body diagrams. Stress and strain - shear, direct stress, basic definitions. Basic stress analysis.

Dry Friction: Limiting friction; Body at rest on an inclined plane; Impending motion up and down an incline.

Rigid Body Motion: Linear motion, displacement, velocity, acceleration, falling bodies, projectiles, relative velocity, application of Newton's 2nd Law. Work done, power and Conservation of Energy.

Angular Motion: Radians, angular velocity and accelerations. Centripetal and centrifugal acceleration.

Behaviour of Fluids: Fluid properties - pressure, temperature, density. Pressure and pressure measurement. Incompressible Fluid Flow. Volume flow rate and mass flow rate. Continuity Equation. Branched Pipes.

Part 3: Teaching and learning methods

Teaching and learning methods: Scheduled teaching and learning includes lectures and tutorial sessions. Demonstrations and practical experiments will be given within the taught sessions and worked examples, class examples and multiple tutorial questions used to clarify and compound understanding.

Independent learning includes hours engaged in problem solving and preparation of tutorial questions and assignment preparation.

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

MO1 Show a basic understanding of mechanical principles including material properties and simple stress analysis.

MO2 Apply mechanical principles to solve problems in static and dynamic engineering situations

MO3 Show cognitive skills with respect to simplifying real problems and applying mathematical methods of analysis

MO4 Apply the principles of Equilibrium, Motion and Conservation of Energy and Conservation of Mass to solve practical problems

Hours to be allocated: 300

Contact hours:

Independent study/self-guided study = 228 hours

Face-to-face learning = 72 hours

Reading list: The reading list for this module can be accessed at readinglists.uwe.ac.uk via the following link https://uwe.rl.talis.com/modules/ufmfag-30-0.html

Part 4: Assessment

Assessment strategy: All the assessments on this module are conducted by our inhouse DEWIS test mechanism where an individualised question set is generated on the system with multiple choices, The students are then generally expected to solve the questions and select the correct answer.
This allows for addressing needs to run a robust assessment which also allows for open book style assessment preparing students well for higher education.
The resit is a repeat of the main run, involving multiple choice e-assessments.

Assessment tasks:

Examination (Online) (First Sit)
Description: Task: Online assessment on Maths taught within the Foundation Mechanics module (DEWIS 2 hours)
Weighting: 10 %
Final assessment: No
Group work: No
Learning outcomes tested: MO3

Examination (Online) (First Sit)
Description: Task: Online assessment based on Statics part of Foundation Mechanics (DEWIS 3 hours)
Weighting: 40 %
Final assessment: No
Group work: No
Learning outcomes tested: MO1, MO2

Examination (Online) (First Sit)
Description: Task: Online assessment for Dynamics and Fluids part of Foundation Mechanics (DEWIS 3 hours)
Weighting: 50 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO2, MO4

Examination (Online) (Resit)
Description: Task: Online assessment on Maths taught within the Foundation Mechanics module (DEWIS 2 Hours).
Weighting: 10 %
Final assessment: No
Group work: No
Learning outcomes tested: MO3

Examination (Online) (Resit)
Description: Task: Online assessment based on Statics part of Foundation Mechanics
(DEWIS 3 hours).
Weighting: 40 %
Final assessment: No
Group work: No
Learning outcomes tested: MO1, MO2

Examination (Online) (Resit)
Description: Task: Online assessment for Dynamics and Fluids part of Foundation Mechanics (DEWIS 3 hours).
Weighting: 50 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO2, MO4

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Electrical and Electronic Engineering {Foundation} [Frenchay] BEng (Hons) 2025-26

Automotive Engineering {Foundation} [Frenchay] BEng (Hons) 2025-26

Aerospace Engineering with Pilot Studies {Foundation} [Frenchay] BEng (Hons) 2025-26

Civil Engineering {Foundation} [Frenchay] BEng (Hons) 2025-26

Mechanical Engineering {Foundation} [Frenchay] BEng (Hons) 2025-26

Engineering {Foundation} [Frenchay] BSc (Hons) 2025-26

Aerospace Engineering {Foundation} [Frenchay] BEng (Hons) 2025-26

Mechatronics Engineering {Foundation} [Frenchay] MEng 2025-26

Mechatronics Engineering {Foundation}[Frenchay] BEng (Hons) 2025-26

Robotics {Foundation} [Frenchay] BEng (Hons) 2025-26

Electrical and Electronic Engineering {Foundation} [Frenchay] BEng (Hons) 2025-26

Robotics {Foundation} [Frenchay] BEng (Hons) 2025-26

Civil Engineering {Foundation} [Frenchay] BEng (Hons) 2025-26

Automotive Engineering {Foundation} [Frenchay] BEng (Hons) 2025-26

Aerospace Engineering with Pilot Studies {Foundation} [Frenchay] BEng (Hons) 2025-26

Mechanical Engineering {Foundation} [Frenchay] BEng (Hons) 2025-26

Mechatronics Engineering {Foundation} [Frenchay] MEng 2025-26

Aerospace Engineering {Foundation} [Frenchay] BEng (Hons) 2025-26

Mechatronics Engineering {Foundation}[Frenchay] BEng (Hons) 2025-26