



## **Module Specification**

### **Foundations of Engineering Science**

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## Part 1: Information

**Module title:** Foundations of Engineering Science

**Module code:** USSJRN-45-1

**Level:** Level 4

**For implementation from:** 2024-25

**UWE credit rating:** 45

**ECTS credit rating:** 22.5

**College:** College of Health, Science & Society

**School:** CHSS School of Applied Sciences

**Partner institutions:** None

**Field:** Applied Sciences

**Module type:** Module

**Pre-requisites:** None

**Excluded combinations:** None

**Co-requisites:** None

**Continuing professional development:** Yes

**Professional, statutory or regulatory body requirements:** None

## Part 2: Description

**Overview:** This module of learning is an introduction to engineering science and methods.

**Features:** Not applicable

**Educational aims:** The overall aim of this module is to ensure that all apprentices have the necessary skills and knowledge to be able to describe and communicate engineering concepts in order to be effective in professional engineering practice.

As an introductory module it will provide:

- An overview of the electrical, mechanical & chemical principles that underpin engineering science.
- Reinforce how these can be described and modelled numerically through discrete calculations and the use of Computer Aided Design tools.
- Ensure that the apprentices have the requisite hand skills and practical aptitude for routine engineering tasks.

**Outline syllabus:** This module is designed to provide the apprentices with the broad engineering skills and scientific knowledge that will underpin their engineering practice and provide the foundation for study as a Healthcare Science Clinical Technologist Practitioner.

#### General Engineering Practice

- An introduction to the Engineering Mathematics.
- An introduction to Computer Aided Design and Simulation.
- An introduction to simple Electrical, & Mechanical Measurements & Safety
- An introduction to the basic properties of materials.

#### Mechanical Engineering Principles

- An introduction to Static Mechanics.
- An introduction to Linear Dynamic Mechanics.
- An introduction to Rotational Dynamic Mechanics.
- An introduction to Work Energy & Power in Mechanical Systems.

#### Electrical & Electronic Engineering Principles

- An introduction to Electrical & Magnetic Fields.
- An introduction to Circuit Analysis.
- An introduction to Circuit-control and Semi-conductors.
- An introduction to Work, Energy & Power in Electrical Systems.

#### Engineering Materials & Fluid Principles

- An introduction to the Effects of Forces on materials.

- An introduction to the Optical properties of materials.
- An introduction to Thermal properties of materials.
- An introduction to Fluid Dynamics.

### **Part 3: Teaching and learning methods**

**Teaching and learning methods:** This module will be delivered via a blended approach of on-campus practical and skills development activities held during block release weeks, and online lectures, seminars and tutorials, held throughout the academic term. It will involve both asynchronous and synchronous content.

Synchronous material will include:

- Practical Lab and workshop Sessions in the block release weeks.
- On-line Lectorials & Seminars that will concentrate on the threshold concept for that session.
- Instructor led tutorials with worked examples of typical assessment questions.

Asynchronous Material will include:

- A set of notes that can be downloaded and referred to throughout the rest of the program.
- Pre-recorded, interactive material that will explain and demonstrate all of the content in the syllabus.
- Algorithmically generated question sets for practice of Numerical methods.
- Directed practice on CAD and simulation packages.

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

**MO1** Describe, explain and calculate electromagnetic, mechanical and chemical properties in order to support routine Engineering Practice.

**MO2** Identify and explain basic electrical & electronic components, combinations & systems in order to support routine Engineering Practice.

**MO3** Identify and explain objectively basic structures & mechanisms and their interaction in order to support routine Engineering Practice.

**MO4** Identify and explain objectively basic material and fluid properties and explain how they can be applied to support routine Engineering Practice.

**MO5** Apply the knowledge and skills to select and use appropriate tools (including Computer Aided Design (CAD) packages) for measurement and operations in order to support routine Engineering Practice.

**MO6** Apply the knowledge and skills to interpret and produce technical documentation (including Computer Aided Design (CAD) packages) for effective engineering communication in order to support routine Engineering Practice.

**Hours to be allocated:** 450

**Contact hours:**

Independent study/self-guided study = 150 hours

Face-to-face learning = 60 hours

Total = 210

**Reading list:** The reading list for this module can be accessed at [readinglists.uwe.ac.uk](https://uwe.rl.talis.com/modules/ussjrn-45-1.html) via the following link <https://uwe.rl.talis.com/modules/ussjrn-45-1.html>

## **Part 4: Assessment**

**Assessment strategy:** The assessments within this module will allow the apprentices to demonstrate their knowledge and the development of their skills applicable within their routine engineering practice.

Assessment 1: On-line assignment

Five on-line, timed, algorithmically generated, tests (20 minutes each) with questions that will be directly aligned with the taught material.

The apprentices will be able to practice with similar style questions through the

course and tutorial sessions will be focused on worked solutions.

#### Assessment 2: Presentation

A 15 minute recorded presentation which will be assessment as learning for the content in the module. The apprentices will be asked to describe and demonstrate (both practically and through simulation) the operation of a specified Medical Electro-mechanical system. The practical and simulation methods will be introduced in the block week and will be further supported by their routine engineering practice.

#### **Assessment tasks:**

##### **Presentation (First Sit)**

Description: 15 Minute Recorded Presentation

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO5, MO6

##### **Online Assignment (First Sit)**

Description: Continuous Assessment (Online)

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4

##### **Presentation (Resit)**

Description:

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO5, MO6

##### **Online Assignment (Resit)**

Description:

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4

## **Part 5: Contributes towards**

This module contributes towards the following programmes of study:

Healthcare Science (Medical Engineering) {Apprenticeship-UWE} [Frenchay] BSc (Hons) 2024-25

Healthcare Science (Radiation Engineering) {Apprenticeship-UWE} [Frenchay] BSc (Hons) 2024-25

Healthcare Science (Rehabilitation Engineering) {Apprenticeship-UWE} [Frenchay] BSc (Hons) 2024-25

Healthcare Science (Renal Technology) {Apprenticeship-UWE} [Frenchay] BSc (Hons) 2024-25