# MODULE SPECIFICATION

| Part 1: Information | | | |
|---|---|---|---|
| Module Title | Applied Electrical Technology | | |
| Module Code | UFMFPS-15-1 | Level | Level 4 |
| For implementation from | 2020-21 | | |
| UWE Credit Rating | 15 | ECTS Credit Rating | 7.5 |
| Faculty | Faculty of Environment & Technology | Field | Engineering, Design and Mathematics |
| Department | FET Dept of Engineering Design & Mathematics | | |
| Module Type: | Standard | | |
| Pre-requisites | None | | |
| Excluded Combinations | None | | |
| Co-requisites | None | | |
| Module Entry Requirements | None | | |
| PSRB Requirements | None | | |

## Part 2: Description

**Overview**: The module will cover material on basic principles of electrical and electronic engineering to students on mechanical engineering and automotive engineering related programmes. Electromechanical systems play an important role in many engineering situations requiring an understanding of basic electronic principles and the operation of electrical motors.

The approach to the subject is to ensure that theoretical principles are backed up by laboratory experience and observation.

**Educational Aims:** The aim of this module is to provide technical underpinning of basic electrical and electronic principles and concepts and to provide practical experience of designing simple electrical and electronic circuits to allow students to integrate knowledge of electrical and electronic principles with other engineering disciplines.

**Outline Syllabus:** The syllabus will include:

Basic electrical quantities (charge, electric field, current, voltage and power) and laws (Coulomb electrostatic force law, Faraday's Law of induction, Ohm's law and Ampere's magnetic force law.).

Basic components of electronic circuits: resistors, capacitors, capacitive, inductors, all semiconducting devices.
Signal parameters and their types.
Operational Amplifiers.
Active Filters: Op amps use in active filter, as an integrator and differentiator, as a comparator and as an oscillator.
Passive filters.
The Cartesian and polar representation of voltage and current.
Electromechanical actuators: Plungers, solenoids. Motors: DC motor/generator, synchronous generator, brushless motors (particularly stepping motors).
Power supplies and measurement instruments.
Principle of operation of common sensors (strain gauges, thermal sensors, and other mechanical sensors).
Use of oscilloscopes, multimeters, bench power supplies and waveform generators.
Undertaking measurements of voltage, frequency and current in a circuit.

**Teaching and Learning Methods:** Learning materials will be delivered using whole cohort sessions supported by small group tutorials and laboratory sessions.

Concepts and the scope of a topic will be introduced in lectures. These will be supported by directed reading and simulation laboratory based work.

Tutorial exercises will provide students confidence in applying the concepts and analysing and designing simple electrical and electronic circuits. The labs sessions will enhance the understanding of students of real-world applications of the material delivered in the module. The students will learn through applying a variety of analysis methods, mathematical and simulation tools to simple circuits and electromagnetic systems.

**Part 3: Assessment**

The assessment is designed to ensure that students have demonstrated practical skills and have developed skills of accurately and concisely recordings taken in laboratory situations and to have demonstrated understanding of underlying principles that determine the behaviour of electrical components. This will ensure that students have the necessary knowledge for modules at higher levels where an understanding of electronic and electrical principles is required.

The module will be assessed using two components.

Knowledge of the properties and characteristic behaviours of electrical components will be consolidated in practical lab sessions and assessed using a laboratory report. (B)

Understanding of underpinning concepts and electrical principles will be assessed by an end of module examination. (A)

The referred assessment will follow the same format as the first sit assessment.

| First Sit Components | **Final Assessment** | **Element weighting** | **Description** |
|---|---|---|---|
| Examination (Online) - Component A | ✓ | 50 % | Online Written examination |
| Laboratory Report - Component B | | 50 % | Report on selected experiments (1500 words) |
| Resit Components | **Final Assessment** | **Element weighting** | **Description** |
| Examination (Online) - Component A | ✓ | 50 % | Online Written examination |

| | | | |
|---|---|---|---|
| Laboratory Report - Component B | | 50 % | Reflective Individual assignment (based on lab work) submissions (1500 words) |

## Part 4: Teaching and Learning Methods

Learning Outcomes

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

| Module Learning Outcomes | Reference |
|---|---|
| Accurately describe the operation of a range of basic electrical/electronic components. (SM1b) | MO1 |
| Provide a detailed explanation the scientific principles of electrical and electromagnetic signals (SM1b) | MO2 |
| Apply relevant scientific principles to the design of electrical and electronic circuits and be able to specify sensor and actuator components to achieve simple design objectives (SM1b, P2, P3) | MO3 |
| Analyse electrical circuits and interpret characteristic behaviour (EA1b, EA2) | MO4 |

Contact Hours

| | |
|---|---|
| **Independent Study Hours:** | |
| Independent study/self-guided study | 114 |
| **Total Independent Study Hours:** | 114 |
| **Scheduled Learning and Teaching Hours:** | |
| Face-to-face learning | 36 |
| **Total Scheduled Learning and Teaching Hours:** | 36 |
| **Hours to be allocated** | 150 |
| **Allocated Hours** | 150 |

Reading List

*The reading list for this module can be accessed via the following link:*

https://rl.talis.com/3/uwe/lists/527BC48C-A1BE-5CAA-CA83-AA4CD8207BE7.html?lang=en-GB&login=1

## Part 5: Contributes Towards

This module contributes towards the following programmes of study:

Mechanical Engineering MEng 2020-21