



Module Specification

Applied Electrical Technology

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Part 1: Information

Module title: Applied Electrical Technology

Module code: UFMFPS-15-1

Level: Level 4

For implementation from: 2022-23

UWE credit rating: 15

ECTS credit rating: 7.5

Faculty: Faculty of Environment & Technology

Department: FET Dept of Engineering Design & Mathematics

Partner institutions: None

Delivery locations: Frenchay Campus, University Centre Weston

Field: Engineering, Design and Mathematics

Module type: Standard

Pre-requisites: None

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body 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.

Features: Not applicable

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 and semi-conducting 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.

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.

Part 3: Teaching and learning methods

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.

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

MO1 Accurately describe the operation of a range of basic electrical/electronic components. (SM1b)

MO2 Provide a detailed explanation the scientific principles of electrical and electromagnetic signals (SM1b)

MO3 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)

MO4 Analyse electrical circuits and interpret characteristic behaviour (EA1b, EA2)

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 114 hours

Face-to-face learning = 36 hours

Total = 150

Reading list: The reading list for this module can be accessed at [readinglists.uwe.ac.uk](https://rl.talis.com/3/uwe/lists/527BC48C-A1BE-5CAA-CA83-AA4CD8207BE7.html?lang=en-GB&login=1) via the following link <https://rl.talis.com/3/uwe/lists/527BC48C-A1BE-5CAA-CA83-AA4CD8207BE7.html?lang=en-GB&login=1>

Part 4: Assessment

Assessment strategy: 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). This series of practical lab sessions will prepare students for an end of module controlled-condition on-campus examination covering electronic circuit design including calculations (A). Component A will contain an element of pre-seen design specification so students can prepare, but with specific details provided at the start of the exam, so students must calculate component values for their design and test performance.

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

Assessment components:

Examination - Component A (First Sit)

Description: PC Lab-based on campus examination

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO3, MO4

Laboratory Report - Component B (First Sit)

Description: Report on selected experiments, with reflective element (1500 words)

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2

Examination - Component A (Resit)

Description: PC Lab-based on campus examination

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO3, MO4

Laboratory Report - Component B (Resit)

Description: Report on selected experiments, with reflective element (1500 words)

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Mechanical Engineering [Frenchay] BEng (Hons) 2022-23

Automotive Engineering [Frenchay] BEng (Hons) 2022-23

Automotive Engineering [Frenchay] MEng 2022-23

Mechanical Engineering [Frenchay] MEng 2022-23

Mechanical Engineering [Sep][FT][Frenchay][3yrs] BEng (Hons) 2022-23

Mechanical Engineering [Sep][SW][Frenchay][4yrs] BEng (Hons) 2022-23

Mechanical Engineering {Apprenticeship-UCW} [Sep][FT][UCW][3yrs] FdSc 2022-23

Automotive Engineering [Sep][SW][Frenchay][4yrs] BEng (Hons) 2022-23

Automotive Engineering [Sep][FT][Frenchay][3yrs] BEng (Hons) 2022-23

Automotive Engineering [Sep][SW][Frenchay][5yrs] MEng 2022-23

Automotive Engineering [Sep][FT][Frenchay][4yrs] MEng 2022-23

Mechanical Engineering [Sep][SW][Frenchay][5yrs] MEng 2022-23

Mechanical Engineering [Sep][FT][Frenchay][4yrs] MEng 2022-23

Mechanical Engineering with Manufacturing {Apprenticeship-UWE} [Sep][FT][UCW][4yrs] BEng (Hons) 2022-23

Mechanical Engineering with Manufacturing {Apprenticeship-UWE} [Sep][FT][COBC][4yrs] BEng (Hons) 2022-23

Mechanical Engineering {Apprenticeship-UCS} [Sep][FT][UCS][3yrs] FdSc 2022-23

Mechanical Engineering {Apprenticeship-UCW} [UCW] FdSc 2022-23

Mechanical Engineering {Apprenticeship-UCS} [UCS] FdSc 2022-23

Mechanical Engineering with Manufacturing {Apprenticeship-UWE} [UCW] BEng (Hons) 2022-23

Mechanical Engineering with Manufacturing {Apprenticeship-UWE} [COBC] BEng (Hons) 2022-23

Mechanical Engineering {Foundation}[Sep][FT][Frenchay][4yrs] BEng (Hons) 2021-22

Mechanical Engineering {Foundation}[Sep][SW][Frenchay][5yrs] BEng (Hons) 2021-22

Mechanical Engineering [Sep][PT][Frenchay][6yrs] BEng (Hons) 2021-22

Automotive Engineering {Foundation}[Sep][FT][Frenchay][4yrs] BEng (Hons) 2021-22

Automotive Engineering {Foundation}[Sep][SW][Frenchay][5yrs] BEng (Hons) 2021-22

Mechanical Engineering [Sep][PT][Frenchay][7yrs] MEng 2021-22

Mechanical Engineering {Apprenticeship-GlosColl} [Sep][FT][GlosColl][3yrs] FdSc 2021-22

