Module Specification

Electrical Technology

Version: 2023-24, v2.0, 15 Mar 2023

Contents

Part 1: Information

Module title: Electrical Technology

Module code: UFMFQ8-30-2

Level: Level 5

For implementation from: 2023-24

UWE credit rating: 30

ECTS credit rating: 15

Faculty: Faculty of Environment & Technology

Department: FET Dept of Engineering Design & Mathematics

Partner institutions: None

Field: Engineering, Design and Mathematics

Module type: Module

Pre-requisites: Engineering Mathematics 2023-24

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: Electrical technology has many varied uses throughout industry and in the organisation of daily life. It is essential that a graduate from an elcectronic, electrical or mechatronics programme is able to appreciate the wide and pervasive used of electrical technology and also have a well founded understanding of the engineering principles that underpin the use of and development of new applications in this field.

Features: Not applicable

Educational aims: The aim of this module is provide an advanced and deep understanding of how electrical pinciples underpin a wide range of electrical engineering applications.

Outline syllabus: The syllabus includes:

Revision of d.c, a.c. and transient circuit analysis.

Three phase circuit analysis - star and delta configurations, real and reactive power, power requirement in three phase systems.

Power factor correction in single phase and three phase systems via reactive power compensation.

Electromagnetic fields and devices, Faraday's Law, Lenz’s Law, Ampere’s Law, flux, mmf, energy stored in magnetic field, the magnetic circuit, BH characteristics including hysteresis and Harmonic distortion.

Operation of single and three phase transformers, equivalent circuit, referred values, saturation, open and short circuit tests, efficiency, and power factor.

Representation and interconnection of the components such as generators, transformers, transmission lines, circuit breakers and loads found in a.c. electrical power systems.

Principles of operation of dc machines, generating and motoring modes, analysis of electric circuit diagram of dc machines, types of dc machines, speed characteristics of dc machines, speed control of dc machines, voltage regulation, applications of dc machines.

Principles of operation of ac machines, generating and motoring modes, analysis of electric circuit diagram of ac machines, types of ac machines, speed characteristics of ac machines, speed control of ac machines, voltage regulation, applications of ac machines.

Principles of operation of stepper motors, analysis of electric circuit diagram of stepper motors, modern speed control of stepper motors, applications of stepper motors.

Principles of operation of brushless dc motors, analysis of electric circuit diagram of brushless dc motors, microprocessor based speed control of brushless dc motors, applications of brushless dc motors.

Principles of operation of linear motors, analysis of electric circuit diagram of linear motors, speed control of linear motors, applications of linear motors.

Part 3: Teaching and learning methods

Teaching and learning methods: Concepts and the scope of a topic will be introduced in lectures which are supported by tutorials and directed reading and laboratory based work.

Tutorial exercises will provide students confidence in applying the concepts and analysing and designing the simple electrical technology circuits.

The lab 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 and mathematical tools to electrical and magnetic circuits.

Relevant ethical issues will be highlighted and students will be encouraged to consider these further through directed reading.

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

MO1 Demonstrate an understanding of Circuit theory for the steady-state and transient solution of direct current, single-phase ac and symmetrical and asymmetrical polyphase circuits

MO2 Describe and explain the characteristics, properties and applications of materials applicable to electrical engineering equipment and manufacturing

MO3 Provide a detailed description of the representation and design of power conversion and drive systems

MO4 Apply electrical principles concepts to the design, application and utilization of electrical equipment with an emphasis on a systems approach to real world problems and applications

Hours to be allocated: 300

Contact hours:

Independent study/self-guided study = 228 hours

Face-to-face learning = 72 hours

Total = 300

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/index.html

Part 4: Assessment

Assessment strategy: Summative assessment is composed of one examination to ensure that the student shows competence in the design aspects of the module. The examination also assesses understanding of the theoretical aspects underpinning of Electrical Technology.

Formative assessment will be provided throughout the module through verbal feedback during laboratory sessions and through in class exercises.

The resit assessment will take the same format as the 1st sit examination

Assessment tasks:

Examination (Online) (First Sit)
Description: Online Examination (24 hours)
Weighting: 100 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2, MO3, MO4

Examination (Online) (Resit)
Description: Online Examination (24 hours)
Weighting: 100 %
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:

Mechatronics [UCS] FdSc 2022-23

Mechatronics [GlosColl] FdSc 2022-23

Mechatronics {Apprenticeship-UCW} [Sep][FT][UCW][3yrs] FdSc 2021-22

Electronics and Telecommunication Engineering {Foundation} [Feb][FT][GCET][4yrs] BEng (Hons) 2021-22

Electronics and Telecommunication Engineering {Foundation} [Oct][FT][GCET][4yrs] BEng (Hons) 2021-22