Module Specification

Systems Design

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Contents

Part 1: Information

Module title: Systems Design

Module code: UFMFUS-15-2

Level: Level 5

For implementation from: 2025-26

UWE credit rating: 15

ECTS credit rating: 7.5

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: In this module students are introduced to the multidisciplinary challenges present in engineering designs that include electromechanical elements in designs and to develop an appreciation of a systems-based design philosophy.

The key outcome will be the understanding of techniques for system realisation that address the optimal integration of mechanical, electrical/electronic and software

engineering to produce products or processes against a given set of client and socio-economic requirements.

Features: Not applicable

Educational aims: This module provides a systematic approach to the design of electro-mechanical systems and develops the students 'systems design thinking'.

Outline syllabus: Topics are likely to include, but not be limited to:

Design and realisation of electromechanical systems:

Application of electromechanical elements: This section is concerned with power sources, programmable logic controllers, microcontrollers and their peripherals, sensors and signals, actuators, motors and their control, interfacing, transformers, and basic closed-loop control. Their integration to form electromechanical systems.

Design and application of machine elements:

This section is concerned with the mechanical design, selection, application, and specification of bought-out components and equipment based on cost, risk & reliability, and ethical considerations.

Combined, the two sections examine areas related to the engineering design activity, user requirements, design specification, concept design and selection, product life cycle management, sustainability, design of integrated electromechanical systems and software interfacing, and introduction to engineering standards.

Part 3: Teaching and learning methods

Teaching and learning methods: Material will be delivered in whole cohort sessions supported by online resources. The majority of the learning activity will take place in group-based workshops working on the electromechanical design tasks in computers and mechatronic laboratories.

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

MO1 Investigate and define a design problem, identify and negotiate constrains including environmental and sustainability limitations, health and safety, cost and risk assessment issues.

MO2 Apply an integrated or systems approach to the solution of complex problems.

MO3 Select and evaluate electromechanical components within a design activity, based on an understanding of their characteristics.

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 114 hours

Face-to-face learning = 36 hours

Reading list: The reading list for this module can be accessed at readinglists.uwe.ac.uk via the following link https://rl.talis.com/3/uwe/lists/CD0366C8-E463-7E85-AD87-304357390246.html?draft=1&lang=en-GB&login=1

Part 4: Assessment

Assessment strategy: The students will work in groups on design activities that will lead to the solution to a mechatronic problem. A question and answer session will be used to determine what the students know and the depth of understanding of the justifications and implementation of potential technical aspects of the project

The assessment for this module is as follows:

The students are required to produce an individual written assignment submitted at the end of the module. The assignment is designed to assess the students' design theory, systems thinking, technical understanding, and application of the various electromechanical devices, integrations, and the selection criteria and process in

manifesting a solution for a given customer. (Maximum 2000 words + computer-aided design and analysis documents).

Resit is the same as the first sit

Risk of plagiarism will be mitigated by the individualised variables and data being issued to students with the assignment brief.

Assessment tasks:

Report (First Sit)
Description: Individual report (2000 words) + supportive documentation
Weighting: 100 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2, MO3

Report (Resit)
Description: Individual report (2000 words) + supportive documentation
Weighting: 100 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2, MO3

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Mechanical Engineering with Manufacturing {Apprenticeship-UWE} [UCW] BEng (Hons) 2023-24

Mechanical Engineering [Frenchay] BEng (Hons) 2023-24

Mechanical Engineering [Frenchay] MEng 2023-24

Mechanical Engineering {Apprenticeship-UCS} [UCS] WITHDRAWN FdSc 2023-24

Mechanical Engineering {Apprenticeship-GlosColl} [GlosColl] FdSc 2023-24

Automotive Engineering {Foundation} [Frenchay] BEng (Hons) 2023-24

Mechatronics {Apprenticeship-UCW} [UCW] FdSc 2023-24

Mechanical Engineering {Foundation} [Frenchay] BEng (Hons) 2023-24

Mechanical Engineering [Frenchay] BEng (Hons) 2024-25

Mechanical Engineering [Frenchay] MEng 2024-25

Mechanical Engineering {Apprenticeship-UCW} [UCW] FdSc 2024-25

Automotive Engineering [Frenchay] BEng (Hons) 2024-25

Automotive Engineering [Frenchay] MEng 2024-25

Automotive Engineering [Frenchay] - Withdrawn MEng 2024-25

Automotive Engineering [Frenchay] BEng (Hons) 2024-25

Automotive Engineering {Foundation} [Frenchay] BEng (Hons) 2023-24

Mechanical Engineering [Frenchay] MEng 2023-24