Module Specification

Systems Design

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Part 1: Information

Module title: Systems Design

Module code: UFMFUS-15-2

Level: Level 5

For implementation from: 2023-24

UWE credit rating: 15

ECTS credit rating: 7.5

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: 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 systems in designs and to develop an appreciation of ‘TOTAL DESIGN’ as a design philosophy.

The key outcome will be the understanding of techniques for product realisation that address the optimal integration of mechanical, 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: Syllabus

Design and realisation of electromechanical systems:

This section examines 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, introduction to design optimisation.

Design and application of machine elements:

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

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

Part 3: Teaching and learning methods

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

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. (EL1, EL4, D2, D3b, P8)

MO2 Develop a feasible computer aided design solution with detailed documentation for a simplified electromechanical system (D3b)

MO3 Identify and create computer-aided models that describe simple electro mechanical systems (SM1b, EA1b)

MO4 Select and evaluate electromechanical components within a design activity, based on an understanding of their characteristics (EA1b, SM2b, EA3b)

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 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:

Group Executive Briefing, for a group mark, to discuss how the final design solution

was planned, conducted, reflecting how the engineers have connected with the groups involved in reaching the client's needs. This will be a briefing with a Question and Answer session taking around 20 minutes.

The group work mark will be moderated using the EDM Group Working Policy.

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, 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

Resit deliverable(s) will be scaled appropriately to group size and task complexity

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

Assessment tasks:

Presentation (First Sit)
Description: Group briefing (20 minutes total – 8 minute presentation, 12 minutes Q&A)
Weighting: 40 %
Final assessment: Yes
Group work: Yes
Learning outcomes tested: MO1, MO2

Report (First Sit)
Description: Individual report (2000 words) + supportive documentation

Weighting: 60 %
Final assessment: No
Group work: No
Learning outcomes tested: MO1, MO2, MO3, MO4

Presentation (Resit)
Description: Group briefing (20 minutes total – 8 minute presentation, 12 minutes Q&A)

Resit deliverable(s) will be scaled appropriately to group size and task complexity
Weighting: 40 %
Final assessment: Yes
Group work: Yes
Learning outcomes tested: MO1, MO2

Report (Resit)
Description: Individual report (2000 words) + supportive documentation
Weighting: 60 %
Final assessment: No
Group work: No
Learning outcomes tested: MO1, MO2, MO3, MO4

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 {Apprenticeship-UCW} [UCW] FdSc 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 with Manufacturing {Apprenticeship-UWE} [Sep][FT][UCW][4yrs] BEng (Hons) 2021-22

Mechanical Engineering with Manufacturing {Apprenticeship-UWE} [Sep][FT][COBC][4yrs] BEng (Hons) 2021-22

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

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

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

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