Module Specification

Electromechanical Systems Integration

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Part 1: Information

Module title: Electromechanical Systems Integration

Module code: UFMEEA-15-M

Level: Level 7

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: This course teaches the design of electromechanical and mechatronic systems that integrate mechanical, electrical, and control systems engineering.

The module covers advanced modelling, design and development cycle of electromechanical and mechatronic solutions to engineering problems. The module is lab-based with students working in small groups on problems that originate from an industrial application or a research problem from the robotics or mechatronics

research carried out within the Department.

Examples may include:
Robots and Machine tools; Car Engine management system; Aircraft actuators from fly by wire.

Features: Not applicable

Educational aims: The aim of this module is to equip students with advanced technical knowledge and practical experiences of the design of electromechanical and mechatronic systems and industrial applications.

Outline syllabus: The syllabus may include but not be limited to the following:

MECHANICAL ELEMENTS:
Acceleration, Velocity, Torque, Inertia; Mechanical transmission; Gearboxes, pulley, belt and chains; Linear and Rotary bearings; Machine screws and Splined shafts.

SYSTEMS INTEGRATION:
Rotary and linear electric motors, gearboxes ,shafts integration.

SYSTEMS MODELLING and CONTROL:
Open, close loop control; Novel controllers; System performance measures; Controllers PC and PLC and Embedded; Software for control, Languages and Platforms.

Part 3: Teaching and learning methods

Teaching and learning methods: A combination of formal lectures, presentations and laboratory sessions will be used as the teaching approach. It is expected that the student will carry out independent study outside the formal sessions.

Scheduled learning includes lectures and laboratory practical sessions.

Independent learning includes hours engaged with assignment preparation and completion etc.

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

MO1 Develop and apply mathematical and computer aided models for the solution and investigation of complex electromechanical and mechatronics systems

MO2 Critically evaluate the fitness for purpose of complex mechatronic systems and propose test procedures for simple systems

MO3 Select and integrate actuators, mechanical elements, control elements and software to perform specific tasks efficiently

MO4 Accurately describe the characterising attributes of a mechatronics system

MO5 Describe and explain in detail the specific issues related to the integration of mechanical, electronic and software elements

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 114 hours

Laboratory work = 24 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/ED45306D-5DBE-B1B3-411F-4C027819EEFF.html?lang=en-US

Part 4: Assessment

Assessment strategy: The assessment for this module is as follows:

Exam: The end of semester exam is used to independently test ability of the students in controlled conditions.

Written assignment: based on laboratory work are to assess student's ability to model and analyse the characteristics of real systems from real time observations. More over it is expected that the student can provide detailed and cogent arguments about their findings and conclusions. The written assignment submission will be made up of 3 mini reports of 1000 words each.

The resit will be the same as the first sit.

Assessment tasks:

Written Assignment (First Sit)
Description: Individual Written Assignment (Max. 3000 words)
Weighting: 50 %
Final assessment: No
Group work: No
Learning outcomes tested: MO1, MO2, MO3, MO4, MO5

Examination (Online) (First Sit)
Description: Online examination (3 hours)
Weighting: 50 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2, MO3, MO4, MO5

Written Assignment (Resit)
Description: Individual Written Assignment (Max. 3000 words)
Weighting: 50 %
Final assessment: No
Group work: No
Learning outcomes tested: MO1, MO2, MO3, MO4, MO5

Examination (Online) (Resit)
Description: Online examination (3 hours)

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4, MO5

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Aerospace Engineering (Systems) [Sep][FT][Frenchay][4yrs] - Not Running MEng 2020-21

Aerospace Engineering (Manufacturing) [Sep][FT][Frenchay][4yrs] - Not Running MEng 2020-21

Aerospace Engineering (Systems) [Sep][FT][Frenchay][3yrs] - Not Running BEng (Hons) 2020-21

Aerospace Engineering with Pilot Studies (Manufacturing) [Sep][FT][Frenchay][4yrs] - Not Running MEng 2020-21

Aerospace Engineering with Pilot Studies (Systems) [Sep][FT][Frenchay][4yrs] - Not Running MEng 2020-21

Aerospace Engineering (Manufacturing) [Sep][SW][Frenchay][5yrs] MEng 2019-20

Aerospace Engineering with Pilot Studies (Manufacturing) [Sep][SW][Frenchay][5yrs] MEng 2019-20

Aerospace Engineering with Pilot Studies (Systems) [Sep][SW][Frenchay][5yrs] MEng 2019-20

Aerospace Engineering (Systems) [Sep][SW][Frenchay][5yrs] MEng 2019-20

Electronic Engineering [Sep][FT][Frenchay][4yrs] MEng 2020-21

Aerospace Engineering [Sep][FT][Frenchay][4yrs] - Not Running MEng 2020-21

Aerospace Engineering with Pilot Studies [Sep][FT][Frenchay][4yrs] - Not Running MEng 2020-21

Automotive Engineering [Sep][FT][Frenchay][4yrs] - Not Running MEng 2020-21

Aerospace Engineering [Sep][SW][Frenchay][5yrs] MEng 2019-20

Aerospace Engineering with Pilot Studies [Sep][SW][Frenchay][5yrs] MEng 2019-20

Electronic Engineering [Sep][SW][Frenchay][5yrs] MEng 2019-20

Automotive Engineering [Sep][SW][Frenchay][5yrs] MEng 2019-20

Automotive Engineering {Foundation} [Sep][FT][Frenchay][5yrs] MEng 2019-20

Automotive Engineering {Foundation} [Sep][SW][Frenchay][6yrs] MEng 2018-19