MODULE SPECIFICATION

Part 1: Information			
Module Title	Integrated Electro-Mechanical Systems		
Module Code	UFMFSL-15-3	Level	Level 6
For implementation from	2022-23		
UWE Credit Rating	15	ECTS Credit Rating	7.5
Faculty	Faculty of Environment & Technology	Field	Engineering, Design and Mathematics
Department	FET Dept of Engin Design & Mathematics		
Module type:	Standard		
Pre-requisites	Systems Design 2021-22		
Excluded Combinations	None		
Co- requisites	None		
Module Entry requirements	None		

Part 2: Description

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

The approach is problem led with majority of the learning being achieved by working in small groups on design tasks that require the integration of disciplines that are required when considering mechatronic systems. To ensure active engagement in the material the module is designed to provide significant laboratory-based design experiences and the consideration of real engineering problems.

The module provides an opportunity for students who wish to learn through laboratory based project work in a small collaborative design team and so helps students understand the role of an engineer working in such an environment.

Educational Aims: This module is designed to demonstrate the necessity to integrate different engineering and technical disciplines in the solution of a systems based problem, taking mechatronics as the vehicle for applying problem based skills to real engineering problems.

Outline Syllabus: Topics covered in the course may include but not be limited to the followings:

Controls Review and Introduction to LabVIEW programming on the myRIO;

Low-level interfacing of software with hardware;

Use of high-level graphical programming tools to implement real-time computation tasks;

Digital logic;

Analog interfacing and power amplifiers;

Measurement and sensing;

Electromagnetic and optical transducers;

Control of mechatronic systems.

Teaching and Learning Methods: The module delivery is designed for students to engage with a series of practical design tasks and demonstrate their problem solving skills.

Lectures are used to set the scene and relevance of the underlying theory and design tasks. The majority of the active learning takes place in tutorials and computer-based practical sessions.

Independent learning includes hours engaged with essential reading, software, group project preparation and completion, etc.

Part 3: Assessment

The module is examined through two components to create a balanced assessment that covers underpinning concepts and applications of the material covered.

Component B:

During the module, students are introduced to a series of practical scenarios that develop their ability to apply concepts of modelling and simulation to the design and validation of electromechanical systems. The coursework assessment is a group based activity (group size 3 or 4 students) resulting in a 24 page technical report where typically three scenarios will be considered. A template will be provided to help students develop their writing style.

Within each scenario students will be required to demonstrate their knowledge of using modelling software packages, and their ability to critically evaluate and analyse results of the structural model. Each student will submit a 250 word reflection summarising their understanding of the conclusions to be drawn from the investigations.

Component A:

A technical oral (group) presentation to assess how students implement their understanding and knowledge of the fundamentals of electromechanical systems based on a real engineering scenario. Students will explain their experimental results and approach to combine in synergy mechanical, electrical, automation and computer science engineering.

Following the presentation, there will be individual questioning where the teaching team will ask questions to evaluate fundamental knowledge of each student in the group and their contribution to the group report.

Resit Strategy:

The resit strategy will be to provide individuals, with the opportunity to rework the experiments carried out in the first sit in order to demonstrate that they have achieved the module learning outcomes.

Component A will be assessed via a presentation and individual questioning and Component B will be assessed by an individual coursework consisting of an 8 page individual technical report that will include a 300 word reflection on the management and operation of a team charged with the task of completing an engineering design project.			
First Sit Components	**Final Assessment**	**Element weighting**	**Description**
Presentation - Component A	✓	40 %	Group presentation and individual questioning (20 minutes total, 8 minutes presentation + 12 minutes questions)
Report - Component B		60 %	Group report (portfolio of three scenarios) 24 pages
Resit Components	**Final Assessment**	**Element weighting**	**Description**
Presentation - Component A	✓	40 %	Presentation and individual questioning (12 minutes total)
Report - Component B		60 %	Individual Report – 8 pages

Part 4: Teaching and Learning Methods

Learning Outcomes

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

Module Learning Outcomes	**Reference**
Create and evaluate an integrated design of a mechatronic system with industrial application	MO1
Model the performance characteristics of a given mechatronic system	MO2
Critically evaluate the design and operation of a mechatronic system including constraints, environmental impact and sustainability limitations, health and safety, and risk assessment considerations.	MO3
Design and Implement an electromechanical solution to satisfy a given set of requirements	MO4

Contact Hours

Independent Study Hours:	
Independent study/self-guided study	114
Total Independent Study Hours:	114
Scheduled Learning and Teaching Hours:	
Face-to-face learning	36
Total Scheduled Learning and Teaching Hours:	36

	Hours to be allocated	150
	Allocated Hours	150
Reading List	*The reading list for this module can be accessed via the following link:* https://uwe.rl.talis.com/modules/ufmfsl-15-3.html	

Part 5: Contributes Towards
This module contributes towards the following programmes of study: Mechanical Engineering [Sep][PT][Frenchay][7yrs] MEng 2018-19 Mechanical Engineering {Foundation} [Sep][SW][Frenchay][5yrs] BEng 2018-19 Mechanical Engineering {Foundation} [Sep][SW][Frenchay][6yrs] MEng 2018-19 Mechanical Engineering [Sep][PT][Frenchay][6yrs] BEng 2018-19 Mechanical Engineering [Sep][PT][COBC][6yrs] BEng 2018-19 Mechanical Engineering {Apprenticeship} [Sep][PT][Frenchay][6yrs] BEng 2018-19