MODULE SPECIFICATION

Part 1: Information			
Module Title	Integrated Electro-Mechanical Systems		
Module Code	UFMFSL-15-3	Level	Level 6
For implementation from	2019-20		
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	Design and Electromechanical Systems 2019-20		
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. There are significant laboratory-based design experiences.

Educational Aims: See Learning Outcomes

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: This module is supported by computer practical sessions. Study time outside of contact hours will be spent on worked exercises and example problems.

Scheduled learning includes lectures, and tutorials to familiarise the learners with computer software.

Independent learning includes hours engaged with essential reading, software, group project preparation and completion, etc. These sessions constitute an average time per level.

Contact Hours:

There are a total of 36 scheduled contact hours for lecturing and tutorials.

Lectures/tutorials: 36 hours

Self-directed learning : 75 hours

Group Project: 63 hours

Total hours : 150

Part 3: Assessment

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

The group work (Component B) will be assessed through a group report where they submit a portfolio of their undertaken experiments. The group presentation (Component A) will give them a real-engineering problem solving experience as they will be working in teams on three different experiments involving the interface between sensors/actuators/controllers and will be individually assessed through a questioning session.

Component A:

A technical oral (group) presentation to assess how students implement their understanding and knowledge of the fundamentals of electromechanical systems under controlled conditions. 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.

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 35 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.

Resit Strategy:

The resit strategy will be to provide the group of students, or individuals, with the opportunity to rework the

experiments carried out in the first sit in order to demonstrate that they have achieved all of the 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**
Report - Component B		60 %	Group report (portfolio of three scenarios)
Presentation - Component A	✓	40 %	Group presentation and individual questioning
Resit Components	**Final Assessment**	**Element weighting**	**Description**
Report - Component B		60 %	Individual Report – 8 pages
Presentation - Component A	✓	40 %	Presentation and individual questioning

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**
Formulate test procedures for performance measurement of mechatronic systems	MO1
Create an integrated design involving actuators, mechanical elements, control elements and software for the efficient performance of specific Mechatronic systems	MO2
Select sensors based on an understanding of their key characteristics	MO3
Use the modelling skills acquired in this module to investigate mechatronic systems	MO4
Identify constraints that impact on the design and operation of a mechatronic system including environmental and sustainability limitations, health and safety and risk assessment issues	MO5
Design and Implement an Electromechanical Solution within a team	MO6

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 (Mechatronics) {Top-Up} [Sep][FT][AustonSingapore][1yr] BEng (Hons) 2019-20 Mechanical Engineering (Mechatronics) {Top-Up} [Feb][FT][AustonSingapore][1yr] BEng (Hons) 2019-20 Mechanical Engineering (Mechatronics) {Top-Up} [May][FT][AustonSingapore][1yr] BEng (Hons) 2019-20 Mechanical Engineering (Mechatronics) {Top-Up} [Sep][FT][AustonSriLanka][1yr] BEng (Hons) 2019-20 Mechanical Engineering (Mechatronics) {Top-Up} [Feb][FT][AustonSriLanka][1yr] BEng (Hons) 2019-20 Mechanical Engineering (Mechatronics) {Top-Up} [May][FT][AustonSriLanka][1yr] BEng (Hons) 2019-20 Mechanical Engineering [Sep][PT][Frenchay][2yrs] MSc 2018-19