Wrexham glyndŵr UNIVERSITY

MODULE SPECIFICATION

Module Title:	**Mechatronic Applications**	**Level**:	6	**Credit Value**:	20

Module code:	ENG60E	**Is this a new module?**	No	**Code of module being replaced**:	ENG662

Cost Centre:	GAME	JACS3 **code**:	H730

Trimester(s) in which to be offered:	1, 2 & 3	**With effect from:**	September 18

School:	Faculty of Arts, Science and Technology	**Module Leader:**	Andrew Sharp

Scheduled learning and teaching hours	60 hrs
Guided independent study	140 hrs
Placement	0 hrs
Module duration (total hours)	200 hrs

Programme(s) in which to be offered	Core	Option
BEng (Hons) Industrial Engineering	✓	☐
BEng (Hons) Automation Engineering	✓	☐

Pre-requisites
None

Office use only

Initial approval June 16

Revised (to include UG suite) September 18 Version 1

Have any derogations received Academic Board approval? Yes ✓ No ☐

Module Aims
This module aims to further develop the students understanding and concepts of mechanical/electrical control, by enhancing their knowledge of applications in mechatronic and industrial engineering so that they will be able to design a mechatronic system to meet an industrial specification.

Intended Learning Outcomes

Key skills for employability

KS1	Written, oral and media communication skills
KS2	Leadership, team working and networking skills
KS3	Opportunity, creativity and problem solving skills
KS4	Information technology skills and digital literacy
KS5	Information management skills
KS6	Research skills
KS7	Intercultural and sustainability skills
KS8	Career management skills
KS9	Learning to learn (managing personal and professional development, self-management)
KS10	Numeracy

At the end of this module, students will be able to		Key Skills	
1	Apply knowledge and understanding gained from theoretical work and investigative work to solve mechatronic problems.	KS1	KS4
		KS3	KS5
2	Demonstrate an understanding of mechatronic engineering and concepts.	KS2	KS3
		KS5	KS6
3	Evaluate components and instruments, from manufacturers' data and principles of operation, in order to determine the most appropriate technology for a given application	KS4	KS5
		KS10	

4	Plan, design and test a mechatronic system; mechatronics systems for industrial product inspecting, quality control and improvement	KS1	KS2
		KS8	KS9

Derogations
A derogation from regulations has been approved for this programme which means that whilst the pass mark is 40% overall, each element of assessment (where there is more than one assessment) requires a minimum mark of 30%.

Assessment:

The assessment is 100% in-course. Assessment 1 - Portfolio of work relating to practical activities inclusive of log-book/diary. An appropriate technical level should be achieved and demonstrated through hardware development.

Assessment 2 - Presentation to provide a clear overview of the topic investigated including explanations and summary of results together with an analysis of their relevance, limitations and how the results relate to the objectives of the engineering design.

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)	Duration (if exam)	Word count (or equivalent if appropriate)
1	1,2,3 & 4	Portfolio	80		3500
1	1,2,3 & 4	Presentation	20	20 minutes	

Learning and Teaching Strategies:

The module will be delivered through practical investigation/demonstrations and Computer Simulations in support of formal lectures and tutorials. Also there will be extensive use of VLE (Moodle) for additional support and formative work outside of timetabled contact periods.

Syllabus outline:

- Modelling and simulation of dynamic processes: Different types of mathematical models for an industrial dynamic process; Mechanical/Electrical analysis-based modelling; Empirical data-based modelling; Linear time invariant models; Model structure selection; Model parameter identification/estimation.

- Analysis and simulation of a range of mechanical/electrical transducers and actuators for analogue/ digital interfaces such as; pressure/ heat/ chemical/ electromechanical/ optical.

- Electronic interface design between the digital controller and the analogue/digital mechatronic processes to maximize the speed, efficiency and reliability of their operation.

- Mechatronic systems design implementation using High level software industry standards, such as VEE /LabView and Matlab, and lower level control using Embedded micro controller functions. Use of PIC's, dedicated industrial microprocessors and PLC interfaces.

- Design mechatronics systems for industrial automation, process quality control and improvement.

Bibliography:

Essential reading

Devdas Shetty, Kolk Richard; (2012); Mechatronics System Design; CL Engineering

Other indicative reading

Alciatore D.; (2012); Introduction to Mechatronics and Measurement Systems; McGraw-Hill Bagad V.S.; (2010) Mechatronics; Technical Publications Pune Bishop R.H.; (2002) Mechatronics handbook : CRC Press

Web Links http://mechatronics.colostate.edu/book/video_demos.html