Prifysgol Wrecsam
Wrexham University

# Module specification

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|---|---|
| Module Code | ENG6AK |
| Module Title | Mechatronics Applications |
| Level | 6 |
| Credit value | 20 |
| Faculty | FAST |
| HECoS Code | 100170 |
| Cost Code | GAME |
| Pre-requisite module | None |

## Programmes in which module to be offered

| Programme title | Core/Optional/Standalone |
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| BEng (Hons) Mechatronics Engineering | Core |

## Breakdown of module hours

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| Learning and teaching hours | 60 hrs |
| Placement tutor support hours | 0 hrs |
| Supervised learning hours e.g. practical classes, workshops | 0 hrs |
| Project supervision hours | 0 hrs |
| **Active learning and teaching hours total** | **0** hrs |
| Placement hours | 0 hrs |
| Guided independent study hours | 140 hrs |
| **Module duration (Total hours)** | 200 hrs |

## 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.

## Module Learning Outcomes

At the end of this module, students will be able to:

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|---|---|
| 1 | Develop critical knowledge and skills on investigating work to solve mechatronic problems. |
| 2 | Develop an in-depth understanding of mechatronic engineering and concepts and critically analyse the operation and performances of mechatronics systems in industrial application. |
| 3 | Critically evaluate components and instruments, from manufacturers' data and principles of operation, in order to determine the most appropriate technology for a given application. |
| 4 | Plan, design and test a mechatronic system; mechatronics systems for industrial product inspecting, quality control and improvement. |

## Assessment

Indicative Assessment Tasks:
This section outlines the type of assessment task the student will be expected to complete as part of the module. More details will be made available in the relevant academic year module handbook.

Assessment 1: A portfolio of work relating to practical activities inclusive of log-book/diary. An appropriate technical level should be achieved and demonstrated through hardware design of a mechatronics system.

Assessment 2: Presentation: to use pre-recorded 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 | Duration/Word Count | Weighting (%) | Alternative assessment, if applicable |
|---|---|---|---|---|---|
| 1 | 1, 4 | Portfolio | 4500 words | 80% | |
| 2 | 2, 3 | Presentation | 10 min | 20% | |

## Derogations

None

## 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 for additional support and formative work outside of timetabled contact periods.

## Welsh Elements

Programme is delivered in English and Chinese, however students can submit assessments in Welsh.

## Indicative Syllabus Outline

Modelling and simulation of dynamic processes: Different types of mathematical models for an industrial dynamic process; Mechanical/Electrical analysis-based modelling; Empirical databased 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.

## Indicative Bibliography

Please note the essential reads and other indicative reading are subject to annual review and update.

Essential Reads:

Shetty, D.; Richard, K.; (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

## Administrative Information

| For office use only | |
|---|---|
| Initial approval date | 24/09/2020 |
| With effect from date | 24/09/2020 |
| Date and details of revision | 22/07/2025 revalidated, LO's 1, 2 and 4 reworded not changed, updated template, derogation removed |
| Version number | 2 |