Prifysgol Wrecsam
Wrexham University

Module specification

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Module Code	ENG438
Module Title	Instrumentation & Control Principles
Level	4
Credit value	20
Faculty	FAST
HECoS Code	100166
Cost Code	GAME
Pre-requisite module	None

Programmes in which module to be offered

Programme title	Core/Optional/Standalone
HNC Electrical & Electronic Technology	Core

Breakdown of module hours

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	**60 hrs**
Placement hours	0 hrs
Guided independent study hours	140 hrs
Module duration (Total hours)	**200 hrs**

Module aims

To develop knowledge and understanding of instrumentation and control principles to facilitate the interpretation of the principles of instrumentation and to facilitate the application of control principles.

Module Learning Outcomes

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

1	Investigate and analyse the operation of contemporary sensors/transducers/transmitters used in-process measurement systems.
2	Investigate and analyse process control systems & controllers.
3	Investigate and apply the principles of using regulating units.

Assessment

Indicative Assessment Tasks:

Assessment is 100% in-course. 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: Outcomes 1 and 3 would be assessed by the student producing a short reports covering practical exercises performed in a laboratory environment.

Assessment 2: Outcome 2 would be assessed by the student producing a report based on an investigation of process control systems & controllers.

Assessment number	Learning Outcomes to be met	Type of assessment	Duration/Word Count	Weighting (%)	Alternative assessment, if applicable
1	1,3	Practical	2400 words	60%	
2	2	Coursework	1600 words	40%	

Derogations

None

Learning and Teaching Strategies

The module will be presented to students through a specified series of lectures assisted by notes via VLE platform. Lectures will deliver key concepts, ideas, theories and examples.

Interactive classes, structured assignments and exercises will assist to achieve learning outcomes.

Students will explore the theoretical aspects of the topics and compare them with practical exercises performed in a laboratory environment.

Welsh Elements

This module will be delivered through the medium of English; however, students have the option to submit their assessments in the medium of Welsh. While this module is not currently offered fully through Welsh, Welsh language support and guidance are available, and some learning materials or tutorial discussions may incorporate Welsh elements where appropriate.

Indicative Syllabus Outline

1. **Instrumentation systems:** System terminology, sensors/transducers, transmitters/signal converters, transmission medium.
2. **Process control & system controllers:** Need for process control, quality, safety, consistency of product. Process controller terminology, deviation, range, span, control effect, set point, process variable, one-off control, two step control, measured variable, bumpless transfer, process variable tracking, integral, derivative, proportional. System terminology, distance velocity lags, multiple transfer lags, capacity, resistance, dead time, reaction rate, open loop closed loop. Tuning, Zeiger Nichols, continuing cycle, reaction curve. System representations, P & I diagrams, wiring diagrams, constructing and using diagrams.
3. **Regulating units:** Terminology, body, trim, plug guide and seat, valve, bonnet, packing gland, yoke, and actuator. Regulating units. Dampers, power cylinders, louvers, valve positioners.

Indicative Bibliography

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

Essential Reads:

Bolton W., (2001) Instrumentation & Process Measurement. Butterworth-Heinemann. 2nded.

Other indicative reading:

Bolton W., (2021) Instrumentation and control systems. Oxford, UK. 3rded.

Administrative Information

For office use only	
Initial approval date	August 2016
With effect from date	September 2021
Date and details of revision	6 July 2021, revalidated. 05/05/2026 updated to new template and changed from optional to core during re-validation.
Version number	3