

Module specification

When printed this becomes an uncontrolled document. Please access the **Module Directory** for the most up to date version by clicking on the following link: [Module directory](#)

Refer to the module guidance notes for completion of each section of the specification.

Module code	ENG438
Module title	Instrumentation & Control Principles
Level	4
Credit value	20
Faculty	FAST
Module Leader	Dr Z. Cheng
HECoS Code	100166
Cost Code	GAME

Programmes in which module to be offered

Programme title	Is the module core or option for this programme
HNC Electrical & Electronic Technology	Optional

Pre-requisites

None

Breakdown of module hours

Learning and teaching hours	60 hrs
Placement tutor support	0 hrs
Supervised learning e.g. practical classes, workshops	0 hrs
Project supervision (level 6 projects and dissertation modules only)	0 hrs
Total active learning and teaching hours	60 hrs
Placement / work based learning	0 hrs
Guided independent study	140 hrs
Module duration (total hours)	200 hrs

For office use only	
Initial approval date	August 2016
With effect from date	September 2021

Date and details of revision	6 July 2021, revalidated
Version number	Version 2

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:

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 is 100% in-course.

Assessment One: Outcomes 1 and 3 would be assessed by the student producing a short reports covering practical exercises performed in a laboratory environment (2400 words).

Assessment Two: Outcome 2 would be assessed by the student producing a report based on an investigation of process control systems & controllers (1600 words).

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)
1	1, 3	Practical	60%
2	2	Coursework	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.

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.

Employability skills – the Glyndŵr Graduate

Each module and programme is designed to cover core Glyndŵr Graduate Attributes with the aim that each Graduate will leave Glyndŵr having achieved key employability skills as part of their study. The following attributes will be covered within this module either through the content or as part of the assessment. The programme is designed to cover all attributes and each module may cover different areas. [Click here to read more about the Glyndwr Graduate attributes](#)

Core Attributes

Engaged
Creative
Ethical

Key Attitudes

Resilience
Confidence
Adaptability

Practical Skillsets

Digital Fluency
Critical Thinking
Communication