

Module specification

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Module Code	ENG5AE
Module Title	Instrumentation and Condition Monitoring
Level	5
Credit value	20
Faculty	FAST
HECoS Code	100166
Cost Code	GAME

Programmes in which module to be offered

Programme title	Is the module core or option for this programme
BEng (Hons) Industrial Engineering Design (Electrical & Electronic)	Core
FdEng Industrial Engineering (Electrical and Automation)	Core

Pre-requisites

None

Breakdown of module hours

Learning and teaching hours	30 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	30 hrs
Placement / work based learning	0 hrs
Guided independent study	170 hrs
Module duration (total hours)	200 hrs

For office use only	
Initial approval date	11/09/19
With effect from date	11/09/19

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Date and details of revision	30/01/20 admin update of derogation Sept 2022, addition of FdEng Industrial Engineering (Electrical & Electronic)
Version number	2

Module aims

The module aims to develop knowledge and skills on industrial process instrumentation and condition monitoring, and to develop knowledge of essential principles, components, devices, applications, and terminologies used in industrial practices and processes.

Module Learning Outcomes - at the end of this module, students will be able to:

1	Apply knowledge and understanding gained from theoretical work and investigative work to solving industrial engineering application problems.
2	Evaluate instruments, from manufacturers' data and principles of operation, in order to determine the most appropriate technology for a given application.
3	Demonstrate thorough understanding of condition monitoring principles and their applications in industries.
4	Select from a range of analysis methods and possible solutions to suit different practical analysis and design situations

In addition to the module learning outcomes, students will also cover the following accreditation of higher education programme (AHEP) fourth edition learning outcomes: C12 for BEng Industrial Engineering Design (Electrical & Electronic) and F12 for FdEng Industrial Engineering (Electrical & Electronic).

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 Case Study should be made which examines several technologies for measuring the same measurement. Manufacturers' recommendations and their own case studies should be examined with findings summarised into advantages/disadvantages, this should be completed in conjunction with experimental work in order to prove/disprove manufacturers claims.

Assessment 2 – A portfolio representing individual tasks on the understanding of condition monitoring principles and the investigation of the industrial applications of condition monitoring.

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)
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1	1,2,	Written Assignment	50
2	2,3,4	Portfolio	50

Derogations

A derogation from regulations has been approved for this module 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%.

Learning and Teaching Strategies

Lectures - presentation of theory, facts and concepts, relating to instrumentation, in order to convey critical information. Interaction or active learning should be implemented to develop an understanding of principles and concepts and stimulate discussion.

Demonstrations – Laboratory experiments performed in order to demonstrate instrument characteristics.

Specialist knowledge and expertise from industrial partners can and will be disseminated to other students where relevant.

Computer Labs – Use of software in order to aid development of understanding and to implement software simulations.

Indicative Syllabus Outline

Process and measurements: different industrial process; process variables; inter-relationship between process variables and their effects upon measuring systems and instrumentation; the range of types of sensors, actuators and motor hardware used in industrial process and their operation, construction and application.

Instrumentation of industrial process: design/selection, implementation and commissioning a system of measurement for a given process variable; organisational standards; data acquisition and analysis for condition monitoring and process control; appropriate software to analyse equipment and systems.

Maintenance, repair and condition monitoring: the methods for the detection, measurement, assessment, and condition monitoring; NDT, vibration, temperature, etc.; reliability centred maintenance (RCM) strategies; different analysis techniques to be able to critically analyse collected data from various monitoring equipment; safety, security economics, sustainability issues in condition monitoring system design, implementation and operation.

Indicative Bibliography:

Please note the essential reads and other indicative reading are subject to annual review and update. Please ensure correct referencing format is being followed as per University [*Harvard Referencing Guidance*](#).

Essential Reads

W. Dunn, *Fundamentals of Industrial Instrumentation and Process Control*, Second Edition, McGraw-Hill Education, 2018.

Other indicative reading

A.S. Morris, *Measurement and Instrumentation Theory and Application*, Academic Press, 2011.

W. Bolton, *Instrumentation and Control*, Newnes, 2015.

IET Study Resources: <http://www.theiet.org/students/resources/index.cfm>

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.

Guidance, from the following list, delete the attributes that are not covered by this module

Core Attributes

Engaged
Enterprising
Creative
Ethical

Key Attitudes

Commitment
Curiosity
Resilience
Confidence
Adaptability

Practical Skillsets

Digital Fluency
Organisation
Leadership and Team working
Critical Thinking
Emotional Intelligence
Communication