Wrexham Glyndŵr UNIVERSITY

MODULE SPECIFICATION

Module Title:	**Transducers**	Level:	4	**Credit Value**:	20

Module code:	ENG420	**Is this a new module?**	No	**Code of module being replaced**:	ENG412

Cost Centre:	GAME	**JACS3 code**:	H661

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

School:	Faculty of Arts, Science and Technology	**Module Leader:**	Dr Zheng Chen

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) Automation Engineering	✓	☐
FdEng Industrial Engineering	☐	✓

Pre-requisites
None

Module Aims
To develop an understanding of transduction processes and analyse various transducer types, whilst being able to characterise the particular transducer properties.

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	Define the principles of operation of common transducers and match these to the requirements of the measured variables.	KS1	KS5
		KS3	
2	Define and apply the criteria for evaluating the validity of measurements including measurement criteria to quantify errors and considerations for reducing errors or to correct faults; appreciate the effects of sensor measurements on the qualities of the production processes.	KS1	
		KS10	
3	Analyse material or component structures and properties e.g. mechanical, thermal, electrical, and magnetic, and their effects on measurement performances.	KS6	

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:

Report: The student will develop practical solutions to problems which involve the measurement of a particular variable utilising devices that they have constructed. These should be evidenced by a short demonstrations and a report, in which the engineering and scientific principles should be explained along with the criteria by which the device is being tested with analysis of the results.

Multiple Choice Questions: Objective test asking multiple choice questions where the student selects from a bank of answers. May be carried out online.

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)	Duration (if exam)	Word count (or equivalent if appropriate)
1	1&2	Report	60		2500
2	1&3	Multiple Choice Questions	40	1 hr	

Learning and Teaching Strategies:

A Problem-based learning (PBL) approach will be adopted for this module in which students learn about a subject in the context of complex, multifaceted, and realistic problems The goals of PBL are to help the students develop flexible knowledge, effective problem solving skills, self-directed learning, effective collaboration skills and intrinsic motivation. Working in groups, students identify what they already know, what they need to know, and how and where to access new information that may lead to resolution of the problem. Whilst group work is acceptable for the development phase, each individual student should produce their own finished product/device which is to be used for their demonstration.

Syllabus outline:

- Description of Physical Variables: linear and angular displacement, velocity, strain, flow, level, etc. Selection of appropriate transducers for above with signal conditioners where required.
- Case studies of industrial applications and subject-relevant systems. Selection of appropriate components for a given measurement system.
- Comparison of the Measurement Techniques: analysis of performance parameters of the measurement techniques in terms of accuracy, resolution, sensitivity and repeatability. Selection of appropriate components for a given measurement system; appreciate the effects of measurements performances on the quality control and quality improvement of industrial processes.

Bibliography:
Essential reading
D. Murty (2009) *Transducers and Instrumentation*, Prentice Hall
Other indicative reading
M. J. Joshi (2008) *Transducers for Instrumentation*, Laxmi Publications