Wrexham glyndŵr UNIVERSITY

MODULE SPECIFICATION

Module Title:	**Engineering Science A**	**Level**:	4	**Credit Value**:	20

Module code:	ENG452	**Is this a new module?** NO	**Code of module being replaced**:	

Cost Centre:	GAME	**JACS3 code**:	H174

Trimester(s) in which to be offered:	1, 2 & 3	**With effect from:**	September 16

School:	Applied Science, Computing & Engineering	**Module Leader:**	Bobby Manesh

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
FdEng Industrial Engineering	☐	✓

Pre-requisites
none

Derogations
A derogation from regulations has been approved for this module which means that whilst the pass mark is 40%, each element of assessment requires a minimum mark of 30% for the module to be passed overall.

Office use only

Initial approval June 16

APSC approval of modification August 20 Version 2

Change from core to optional module

Have any derogations received SQC approval? Yes ✓ No ☐

Module Aims
The aim of the module is to provide learning experiences in applied engineering sciences theory, which will form a foundation for the initial engineering practices.

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	Apply knowledge and understanding of scientific principles to the solution of practical engineering problems	KS5	
2	Demonstrate acquired knowledge and understanding of the basic theoretical aspects of engineering science	KS5	
		KS9	
3	Use correct terminology and correctly apply SI units when solving scientific problems	KS1	

Assessment:
Assessment 1 - A series of Laboratory experiments will be undertaken relating to the engineering science theoretical principles. The experiment's purpose equipment, conditions and results should be documented and handed in as a Laboratory report.

Assessment 2 - The theoretical aspects of the delivery will be assessed by means of an in course test, this will be closed book and the students will be expected to recall formulae necessary for calculations.

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)	Duration (if exam)	Word count (or equivalent if appropriate)
1	1&3	Coursework	50		2000
2	2&3	In-class test	50	1.5hrs	

Learning and Teaching Strategies:

Laboratory work – would involve a series of experiments embedding principles with practical considerations. Each experiment will focus on a certain aspect of engineering science, but should also incorporate elements of previous knowledge acquired from other experiments. They will be devised to develop an understanding of the principles and the application of this knowledge in a purposeful way.

Principles and theory will also be delivered during traditional class delivery sessions along with interactive tutorial sessions.

Aspects of the content that is more specialist to particular groups will be delivered separately in tutorial sessions.

Syllabus outline:

- SI Units: definitions, reasons, conversions;
- Work Energy and Power;
- Force: Scalar and Vector quantities, centre of gravity, equilibrium, coplanar and concurrent;
- Speed Velocity mass and acceleration: Newton's Laws;
- Linear motion, Angular motion and Friction;
- Simple Machines: Force ratio – movement ratio and efficiency, Gear Trains, Levers, pulleys;
- Torque: Transmitted power, Moment of Inertia, Kinetic energy;
- Pressure: Principles, Applied to gasses & Liquids;
- Electricity DC: conductors, insulators & resistors, Ohms Law, Series circuits, parallel circuits, Voltage dividers;
- Electricity AC: Generation, Components (capacitors and inductors) and reactive effects. Series circuits, Impedance, Phasor diagrams, Voltage triangle.
- Forces applied to materials: Hooks Law, Tensile, Compressive, Shear, Elasticity limits, Ductility, Malleability;

- Beams: Moment of force, Equilibrium, point loads, shear force diagrams;
- Fluid mechanics (liquid): density, viscosity, surface tension, cavitation;
- Thermal Physics: Conduction, Convection, Radiation, Heat sink basics, Heat exchanger basics.

Bibliography:

Essential reading

Mike Tooley (2012) *Engineering Science for Foundation Degree*, Routledge

Other indicative reading

J. Bird (2015) *Science for Engineering*, Routledge