Module Title:	Mechatronics 1
Language of Instruction:	English

Credits:	10

NFQ Level:	6

Module Delivered In	2 programme(s)

Module Aim:	To introduce the students to the basic principles of automation. To introduce students to the basic principles of electrical science theory and electrical circuits.

Learning Outcomes	
On successful completion of this module the learner should be able to:	
LO1	Describe the principle operation of standard compressors and ancillary equipment and construct pneumatic circuits using ISO RP68P (pneumatic) symbols and graphically represent basic pneumatic circuits.
LO2	Identify basic engineering components such as pumps, valves and bearings and the application of each.Use of specific lubricants and the correct disposal of same in line with environmental standards
LO3	Identify and describe common electrical components and instruments; define quantities, symbols, units and notation.
LO4	Apply circuit theory principles to solve problems relating to series and parallel electrical circuits.
LO5	Complete laboratory experiments using appropriate apparatus and test equipment; report on the findings.

Pre-requisite learning	
Module Recommendations *This is prior learning (or a practical skill) that is recommended before enrolment in this module.*	
No recommendations listed	
Incompatible Modules *These are modules which have learning outcomes that are too similar to the learning outcomes of this module.*	
No incompatible modules listed	
Co-requisite Modules	
No Co-requisite modules listed	
Requirements *This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.*	
No requirements listed	

Module Content & Assessment

Indicative Content

Compressors
Types of compressors Dryers, drain traps, condensate formation Receivers and pipework Filtration, lubrication & pressure reducing valves

Pneumatic Circuits
Basic Symbols ISO RP68P Cylinder, calculations, types and cushioning 3/2 and 5/2 Valves and their operation Construction of simple circuits A+ B+ A-B- Safety Dump Valves

Electrical Science Theory and Applications
Electrical properties of materials with respect to atoms, charge, voltage, current and resistance. Conductors, semiconductors, and insulators with examples of each. Resistivity and related problems. Resistors, Capacitors and Inductors. Ohm's law. Energy and power (Watts Law). The kilowatt hour (kWh) and related problems. Power rating of resistors. Kirchhoff's circuit laws.

Circuit Analysis
Series, parallel and series-parallel circuit analysis. Total power calculations. Wheatstone bridge. Transient behaviour of capacitors and inductors (RC and LC time constant).

Electric Motor Control Circuits
Operation of Motor D.O.L. circuit, Forward / Reverse electrical and mechanical interlocks

Electrical Protection
Electrical components, Fuses , M.C.B.'s , R.C.D.'s Descrimination

Safety
Two handed control in Pneumatics Operational safety with Hydraulics and Pneumatics Isolation procedures for maintenance

Lubrication
Types of oils, viscosity, viscosity improver's synthetic oils Application of oils and greases Disposal of oils and danger to human health

Assessment Breakdown	%
Continuous Assessment	30.00%
Practical	20.00%
End of Module Formal Examination	50.00%

Continuous Assessment				
Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Practical/Skills Evaluation	Construct Pneumatic circuits,using software and physical hardware in the lab	1	10.00	Week 6
Practical/Skills Evaluation	Series of electrical labs and simulations. Testing circuit...etc	3,4	20.00	Every Second Week

No Project

Practical				
Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Practical/Skills Evaluation	Series of Lab practicals	1,2,3,4,5	20.00	Every Second Week

End of Module Formal Examination				
Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Formal Exam	Questions on LO's 1,2,3,4,5		50.00	End-of-Semester

SETU Carlow Campus reserves the right to alter the nature and timings of assessment

Module Workload

Workload: Full Time		
Workload Type	*Frequency*	*Average Weekly Learner Workload*
Lecture	12 Weeks per Stage	5.00
Laboratory	12 Weeks per Stage	3.00
Independent Learning	15 Weeks per Stage	10.27
	Total Hours	250.00

Module Delivered In

Programme Code	Programme	Semester	Delivery
CW_EMMEC_B	Bachelor of Engineering (Honours) in Mechanical Engineering	1	Mandatory
CW_EEMEC_D	Bachelor of Engineering in Mechanical Engineering	1	Mandatory