AUTO H2004: Mechatronics 4

Module Title:	Mechatronics 4
Language of Instruction:	English

Credits:	5

NFQ Level:	6

Module Delivered In	2 programme(s)

Module Aim:	The aim of this module is to provide the students with the knowledge to design, build and analyse hydraulic and electromechanical systems typically used in industry.

Learning Outcomes	
On successful completion of this module the learner should be able to:	
LO1	Examine and analyse Hydraulic systems
LO2	Describe the operation of AC Motors understanding their specific starting characteristics, efficiencies, speed control and testing.
LO3	Construct basic PLC programs, understand Inputs, Outputs, CPU and control strategies, employing timers/counters in typical industrial programming scenarios (filling systems, production lines) recognising sinking and sourcing output control cards and their application.
LO4	Program and run a motor using a Variable Speed Drive (VSD) in the Lab.

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

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Module Content & Assessment

Indicative Content
Hydraulics Pump selection and calculation of pressure and flow Construction and analysis of hydraulic circuits for particular applications. Filtration and design of Offline filtration loops, with filter sizing and efficiency. Design of hydraulic power packs, including tank, frame, pump position, valve sub plate mounting, heating and cooling circuits.
AC Motors Induction Motors and their operation Torque-load curves and starting characteristics. Methods of starting DOL, Star/Delta, Soft Starters, VSD Calculation of motor size and consideration of energy use over its lifetime in selection of motor types, Eff1, Eff2...
Variable Speed Drives VSDs basic design and function Application of VSD on variable torque loads and potential energy saving of using VSDs on fans, pumps and payback.
Basic PLC programming Input and Output control cards, connection strategies, sinking & sourcing cards, programming methods (statement list, Ladder logic, SFC) programming offline and compiling to Run, error checks and basic control of simulated plant.

Assessment Breakdown	%
Continuous Assessment	50.00%
Project	25.00%
Practical	25.00%

Continuous Assessment

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Examination	In class assessment	1,2,3	15.00	Week 7
Short Answer Questions	Online quizzes on various topics covered	1,2,3	20.00	Every Second Week
Examination	In class assessment	1,2,3,4	15.00	Sem 1 End

Project

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Project	Specified mechatronic project	3	25.00	Week 9

Practical

Assessment Type	*Assessment Description*	*Outcome addressed*	*% of total*	*Assessment Date*
Practical/Skills Evaluation	Series of computer based and laboratory based labs	1,2,3,4	25.00	Every Second Week

No End of Module Formal Examination

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

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Module Workload

Workload: Full Time		
Workload Type	*Frequency*	*Average Weekly Learner Workload*
Lecture	12 Weeks per Stage	2.00
Laboratory	12 Weeks per Stage	3.00
Independent Learning	15 Weeks per Stage	4.33
	Total Hours	125.00

Module Delivered In

Programme Code	Programme	Semester	Delivery
CW_EMMEC_B	Bachelor of Engineering (Honours) in Mechanical Engineering	4	Mandatory
CW_EEMEC_D	Bachelor of Engineering in Mechanical Engineering	4	Mandatory