

Module Title:	Power Electronics & Electrical Systems
Language of Instruction:	English
Credits:	5
NFQ Level:	8
Module Delivered In	1 programme(s)
Teaching & Learning Strategies:	A combination of lectures, class discussions, tutorials, laboratory exercises and demonstrations will be used. Emphasis will be placed on active learning including problem / project-based learning.
Module Aim:	To understand the generation, control, distribution, and consumption of electrical power within an industrial environment. Understand the hazards and safety procedures associated with electrical systems.
Learning Outcomes	
<i>On successful completion of this module the learner should be able to:</i>	
LO1	Analyse how electrical power is generated and consumed.
LO2	Plan the regulation and distribution of electrical power in industrial environments.
LO3	Analyse, model, and simulate electrical systems in software.
LO4	Assess the hazards and safety systems associated with electrical systems.
Pre-requisite learning	
Module Recommendations	
<i>This is prior learning (or a practical skill) that is recommended before enrolment in this module.</i>	
No recommendations listed	
Incompatible Modules	
<i>These are modules which have learning outcomes that are too similar to the learning outcomes of this module.</i>	
No incompatible modules listed	
Co-requisite Modules	
No Co-requisite modules listed	
Requirements	
<i>This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.</i>	
No requirements listed	

Module Content & Assessment

Indicative Content

Electrical Power Systems

Single-phase and three-phase generation and distribution. AC generators, DC generators, transformers, rectifiers, and inverters. Electrical schematics and symbols.

Sensors and Switches

Proximity switches, photoelectric switches, limit switches, level switches, flow-switches, Temperature, and pressure switches. Relays, power relays, general-purpose relays, latching relays, solid-state relays. Electric contact classification.

Motors and Actuators

AC motors, DC motors, synchronous, inductions and stepper motors. Motor constructions and operations. Motor control and factors affecting motor output power, torque, speed and direction of rotation. Linear actuators.

Safety Systems

Dangers and hazards associated with high voltage lines and equipment. Principle of operation of circuit breakers. MCB rating and trip characteristics. Fuse types and ratings, RCD and RCBO principles. Emergency stops and Lock-out systems.

Assessment Breakdown	%
Continuous Assessment	20.00%
Practical	20.00%
End of Module Formal Examination	60.00%

Continuous Assessment

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Examination	A mixture of theory and/or practical assessments to reinforce learning throughout the semester.	1,2,4	20.00	n/a

No Project

Practical

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Practical/Skills Evaluation	A series of practical exercises and tasks to complement the theory elements of the module.	3,4	20.00	n/a

End of Module Formal Examination

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Formal Exam	Final Examination	1,2,4	60.00	End-of-Semester

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

Module Workload

Workload: Full Time		
<i>Workload Type</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
Lecture	Every Week	3.00
Laboratory	Every Week	2.00
Independent Learning Time	Every Week	2.00
Total Hours		7.00

Module Delivered In

Programme Code	Programme	Semester	Delivery
CW_EEROB_B	Bachelor of Engineering (Honours) in Robotics and Automated Systems	8	Mandatory