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| 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 |