Certificate in

Industrial Electrical Safety and Systems

ess

Providing asset optimisation & compliance through people

GRIFFITH COLLEGE
EST. 1974

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Certificate in Industrial Electrical Safety and Systems

The Certificate in Industrial Electrical Safety and Systems is recommended for anyone who works with electrical systems and is designed to give non-electrical personnel the ability to diagnose industrial faults and to carry out repairs/replacement safely.

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TYPE:
Certificate

MODE:
Part-time
(Block-release, blended delivery)

DURATION:
6 weeks

NFQ LEVEL:
6

VALIDATED BY:
QQI

CAMPUS:
Dublin
Limerick
Cork

ESS provide Asset Optimisation and Compliance through People. We work with people to implement and carry out maintenance and asset management and to optimise performance. We believe that it is people that make things work and that improvements and sustainability are driven by supporting, training and educating people.

Our Values

- **Respect**
- **Accountability**
- **Act like an owner**
- **Innovating & learning**
- **Challenge & Support**

Course Overview:

The QQI-accredited Certificate in Industrial Electrical Safety and Systems is a part-time course, typically delivered in block-release over a 6-week period. The CIESS programme aims to turn out technicians with a knowledge of industrial electrical engineering and the skills needed to specify, install, test, and validate electrical and control systems and their operations in a safe manner.

The programme will build the theoretical and practical aptitude of the learners and introduce them to key relevant technologies and knowledge necessary for employment in the industrial electrical sector.

The learners will gain a broad technical knowledge in the core discipline – electrical engineering and will be provided the theoretical and mathematical basis for these systems demonstrated through practical application.

Completion of the programme will allow them to understand the electrical maintenance systems and safety required in the manufacturing sectors.

Why Choose Certificate in Industrial Electrical Safety and Systems?

- The QQI Level 6 Certificate in Industrial Electrical Safety and Systems is available on a part-time basis and aims to enable the modern technician to be industry-ready and relevant.
- Learners are introduced to industrial electrical engineering to support their working in industry or enhance employment opportunities.
- The programme aims to turn out technicians with a knowledge of industrial electrical engineering and the skills needed to specify, install, test, and validate electrical and control systems and their operations in a safe manner.
- The practical nature of the coursework lends to preparation for work in industry.
- Part-time learning allows students already working in the area extra time to hone skills.
- This programme may also facilitate learners applying for progression to third-level programmes in NFQ Level 6 (plus) engineering programmes within third-level colleges.

Entry Requirements

Entry requirements (if under 23 years) are a minimum of grade O6 / H7 in the Leaving Certificate, or equivalent, in 5 subjects. The subjects must include mathematics and English, Irish or another language.

Mature learners, i.e., applicants over the age of 23, may also apply based on work experience and / or life experience by demonstrating that they have reached the standards of knowledge, skills, and competence.

The English language entry requirements for the programme are CEF B2+ or equivalent. Candidates with English language levels below CEF B2+ must first reach this minimum standard before enrolling on the academic programme.

Ideally, learners will have some prior technical or mechanical experience or knowledge and/or exposure to a manufacturing environment.

Course Highlights

- The learners will gain a broad technical knowledge in the core discipline – electrical engineering and will be provided the theoretical and mathematical basis for these systems demonstrated through practical application.
- Completion of the programme will allow them to understand the electrical maintenance systems and safety required in the manufacturing sectors.
- Real benefits to employers in improving efficiency, effectiveness and productivity of systems while applying ethical, safe, and sustainable improvements.

5 ECTS

Certificate in Industrial Electrical Safety and Systems

The Industrial Electrical Safety and Systems module is designed around industrial manufacturing and maintenance personnel, to support an understanding of working with industrial electrical systems.

CIESS is designed to give non-electrical personnel the ability to diagnose industrial faults and to carry out repairs/replacement safely.

Learners will be introduced to a clear understanding of the fundamental electrical principles, laws, and concepts relevant to industrial electrical systems as the module design of a mix of theoretical and practical elements.

The programme will build the theoretical and practical aptitude of the learners and introduce them to key relevant technologies and knowledge necessary for employment in the industrial electrical sector.

Minimum intended programme learning outcomes

On successful completion of this programme, learners can:

1. Recognise the safety standards associated with working with electrical circuits and understand how to use electrical test equipment correctly.
2. Appraise, apply the principles, and perform calculations on AC and DC electric circuits.
3. Apply power calculations to electrical systems and understand the effects on transmission and distribution of electrical power in Ireland.
4. Describe the operation, configuration and testing of AC induction motors, interpret electrical drawings and build a basic electrical circuit.

Course Content

Basic Electric Circuits:

- Basic atomic structure
- Conductors and insulators
- Conductor resistance
- Ohm's law
- Connection of voltmeters and ammeters
- Kirchoff's Voltage and current laws
- Voltage divider rule
- Series and Parallel Circuits
- Calculate the value or resistances in Series and Parallel and use a multimeter to measure the resistances
- Power

AC Power and Energy:

- Calculation of AC circuit power
- Power transfer, losses, and efficiency
- Electrical energy
- Sinusoidal AC waveform
- Peak, average and RMS values
- Phase relations and phasor diagrams
- Inductor and capacitor in AC circuit
- Reactance and impedance
- Power factor and power factor correction
- Electric Supply Systems: The various stages involved in the generation, transmission, and distribution of electrical energy
- State how three phase AC is produced and its advantages

Transformer and motor operation:

- The magnetic field
- Flux density
- Faraday's law of electromagnetic induction
- Calculation of induced voltage
- Outline the magnetic effects of electricity and the rules governing magnetic fields
- Explain the operation of a three-phase transformer and a squirrel cage induction motor
- State how to change the direction of rotation
- Calculate the synchronous speed of a three-phase motor
- Recognise the effects of star and delta connections
- Test a three-phase motor for continuity of phases and for insulation between phases and between each phase and the motor frame

Operation and Testing of Control and Power Circuits:

- Outline how contactors and solenoids work
- Predict voltages at given points on an electrical circuit
- Use standard symbols and numbering systems
- Understand wiring, circuit, and schematic diagrams
- Construct control circuits using commonly used electrical components such as, normally open switches, normally closed switches, auxiliary contacts, contactors, thermal overloads, etc.
- Construct and test a DOL motor control circuit
- Carryout fault-finding on the DOL circuit and other circuitsand its advantages

Electrical Safety:

- Identify electrical safety hazards and present ways to minimize or avoid their consequences
- Types of Electrical Faults
- Electrical Safety Standards e.g. I.S. 10101:2020
- Establish a Safe Work Condition, lockout/tagout
- Employer and Employee responsibilities
- State how to protect against indirect contact by means of double insulation, automatic disconnection by earthing, residual current device (RCB), equipotential bonding
- Understand electrical safety devices and such as fuses, MCBs, RCDs, RCBOs etc.

Transfer

Certificate in Industrial Manufacturing and Maintenance Skills, ESS/Griffith College

Progression

Certificate in Industrial Manufacturing and Maintenance Skills, ESS/ Griffith College

Higher National Certificate in Manufacturing Engineering, Griffith College

NFQ Level 6 (plus) engineering programmes within third-level colleges in Ireland

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