

Certificate in High Voltage Electrical Systems

Course overview

The objective of this programme is to upskill electricians and electrical engineers in the niche and highly specialised area of High Voltage Electrical Systems. It will develop the competence of its graduates in areas such as High Voltage electrical installations, grid connections, substation maintenance and switching facilities.

This fully accredited programme will provide companies working in these areas with a new benchmark in terms of upskilling and certifying staff working in these environments.

Furthermore it will enhance safe working practices, increases technological competences and support industry employers in authorising their employees to install, operate and maintain high voltage electrical systems.

30 Credits
Technical

+

10 Credits
HV Health
& Safety

+

20 Credits
Work Based

=

60 Credits



Employer obligations

- ensure participants line manager supports the learner for duration of programme
- allocate suitable time for them to attend classes and complete coursework
- provide a suitably qualified industry mentor to assist with the work-based learning aspects of the programme.

Programme modules

Semester 1 – Waterford

AC Electrical Theory	5 Credits
This module provides a review of the theory and principles of AC Electrical Theory and Circuits. Learners will cover an introduction to three phase circuits, balanced and unbalanced loads and a basic introduction to power factor correction and fault calculations.	
Substation Design and Layout	5 Credits
This module provides an overview of the design and layout of a typical High Voltage (HV) substation. The key elements of a substation will be reviewed and the common configurations and layout will be covered. Earthing of substations and calculations of step and touch distances will also be covered. Maintenance and safety procedures and the range of technical studies required for the safe design of a substation will also be reviewed.	
High Voltage Power Grid & Infrastructure	5 Credits
This module provides an overview of the transmission & distribution networks of a typical electrical supply system. Learners are introduced to the main elements of electrical infrastructure and cover the selection and testing of cables used in HV electrical installations. An overview of the electricity supply market DSO/TSO, meter, tariffs is provided. Distributed generation will also be discussed.	
High Voltage Safety Compliance	5 Credits
This module introduces the learner to the various Health & Safety Requirements for Electrical Personnel working on and planning works on HV Electrical Installations. Safety, Health & Welfare at Work Act is covered where learners explore the importance of the Project Supervisor Design Process (PSDP), Project Supervisor Construction Stage (PSCS), the roles of "Authorised Person" and "Senior Authorised Person" as well as the process of preparing RAMS (Risk Assessment, Method Statements).	
Industrial Portfolio (1)	10 Credits
Work Based Learning (supervised by Industry Mentor)	

Testimonials

Company A

"I found that the course was very beneficial to me in my everyday work onsite. While it is challenging, I believe it has enhanced my HV knowledge and has only increased my interest in HV Engineering."

Benefits to the employer

- 1. Trained personnel in High Voltage Systems**
- 2. Pipeline for promotion**
This programme has been designed to provide learners with core competencies required to advance toward company specific positions that require increased responsibility within the High Voltage Systems sector (such as Authorised Person, Installation manager / Workplace co-ordinator etc.).
- 3. Confidence in High Voltage Health & Safety**
Employers who utilise this programme will have the confidence that their employees have comprehensive Health & Safety understanding of High Voltage Environments.
- 4. Third Level Certification** (previously not available)
Employers will have a process to guarantee a third level certified qualification for their High Voltage installation team. This is the first and only qualification in Ireland providing this.
- 5. Competitive advantage**
Employers will have increased capacity to provide certified skills credentials when tendering for national and international contracts.
- 6. Talent Retention and employee satisfaction**
Providing staff with opportunities for professional development can increase employee satisfaction and loyalty.

Semester 2 – Limerick

High Voltage Protection Systems	5 Credits
Overview of Protection, Protective Schemes & Systems. Fundamental requirements of Protective Relaying, Terms, Calculation of relay operating time etc. Practical application in setting up and testing of Overcurrent and Earth Fault. An overview of instrumentations transformers, discrimination, protection functions (ANSI Codes) control, Interlocking, and logic.	
Transformer Theory and Practice	5 Credits
The Transformer Theory and Practice module develops a knowledge of the modern theory and practice of transformers. The module provides the learner with knowledge of the types, sizing, characteristics, applications and control of transformers in industrial networks and plant.	
High Voltage Switchgear	5 Credits
The High Voltage (HV) Switchgear module develops a thorough understanding of switchgear requirements for the HV electrical power system. It includes the design, selection, installation and testing of switchgear.	
High Voltage Safe Working Systems	5 Credits
This module develops the learners knowledge of the various Health & Safety Requirements for Electrical Personnel working on and planning works on HV Electrical Installations. The learner explores EN 61936 and IS EN 50110, the Safety requirements when working on installations with voltages exceeding 1,000 volts and the steps involved in developing a Safe Switching Plan. Learners explore the particular dangers and risks when working in MV/ HV environments and examine how to develop a safe switching plan and lock out/tag out procedures.	
Industrial Portfolio (2)	10 Credits
Work Based Learning (supervised by Industry Mentor)	

Company B

"...the lecturers were experts in their fields and had a great ability to break down the complexity of the subject to an enjoyable learning process. One of the most valuable aspects of the course was the site visits, where we could experience High voltage Infrastructure and switchgear in a controlled environment to further our understanding of what was learned in class. I wanted to broaden my knowledge in the High Voltage sector and this course exceeded my expectations across all modules."

Delivery model

This is a part-time blended learning programme run over one year that utilises a hybrid model of on campus and work-based learning.

In total, this programme will require the student to be released for 24 x Fridays during the academic year (12 days in Semester 1, 12 days in Semester 2).

There is an Industrial Portfolio (work based learning) element to each semester that is completed during the summer 2025 period.

*** Candidates must be able to complete their work-based learning in a mentored High Voltage environment.**

SEMESTER 1	SEMESTER 2	SUMMER 2025
Sept - Dec 2024 12 x Fridays	Jan - May 2025 12 x Fridays	
Waterford (SETU)	Limerick (TUS)	Workplace (Industry Portfolio completion)

In addition to the weekly lectures candidates will need to spend at least an equivalent amount of time on self-directed learning in order to fully understand concepts and complete assignments etc.

Academic support

Students will have full access to a range of supports available online and through Blackboard, our virtual learning environment. These include our new online programme, PACE, which is designed to support students to access and effectively use library resources in order to complete assignments. Additional supports include an Academic Writing Centre and Maths Support Centre, freely available to all students.

Fees and funding

€6,000 Course fee

Cobotics Skillnet (www.coboticsskillnet.ie) is offering 50% funding (€3,000) to eligible companies).

How to apply

www.setu.ie/highvoltage

or

www.tus.ie/courses

Entry requirements

Candidates for this programme must be:

- An electrical employee of a company in the High Voltage sector who will be assigned to projects in the HV sector to enable the student to fulfil the Industry Portfolio modules
- and
- At a minimum, a holder of the following academic and professional qualifications/experience:
 - Advanced Craft Certificate in Electrical (or equivalent) and a minimum of 1 year verified relevant experience in an Industrial Electrical Environment;
 - or
 - Level 7 Ordinary Degree in Engineering in Electrical Engineering (or equivalent) and a minimum of 1 year verified relevant experience in an Industrial Electrical Environment.

Commencement date
September 2024

To apply, contact:
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TUS