



Accredited Provider
The Skills College for Development and Training (Pty)Ltd.

National Certificate: Electrical Engineering

Qualification ID 73313– NQF 2; 140 Credits

INTRODUCTION

Purpose:

The purpose of this qualification is to provide learners, education and training providers and employers with the standards and the range of learning required to work effectively within various industries, making use of electrical engineering knowledge and skills to meet the challenges of such an environment.

Qualifying learners will also be able to relate their learning to scientific and technological principles and concepts. They will also be able to maintain and support the various policies and procedures related to the safety, health, environment and quality systems that govern their workplace.

Qualifying learners at NQF Level 2 will be able to:

Use engineering tools, measuring instruments and electrical technology.

Read, interpret and produce basic electrical engineering drawings and circuits.

Apply hand skills applicable to electrical installation and maintenance.

Understand and apply basic electrical installation assembly techniques to install, maintain, repair, overhaul or recondition designated circuits, electrical machines and sub-components.

Understand basic electrical theory and the application in relation to the maintenance and function of machines.

With this understanding, learners will be able to participate in workplace activities. The foundational learning in this Qualification would serve as a basis for further learning where they will engage in more advanced installation, maintenance and repair activities.

Rationale for the qualification:

This is the first of a three-level qualification series that reflect the workplace-based needs of the electrical field that is expressed by employers and employees, both now and for the future. This electrical engineering qualification provides the foundational competencies required to work on designated electrical circuits and installations. This qualification provides the learner with accessibility to be employed within the electrical engineering field and provides the flexibility to pursue different careers across various industry sectors and articulate within industries such as:

Manufacturing and Engineering.

Energy Sector.

Mining.

Chemical.

Transport.

Other related engineering industry sectors.

This qualification will enhance the status and productivity of the learner as well as contribute to improved quality, production rate and growth within relevant electrical sectors. The range of typical learners at this level could include individuals preparing to qualify in occupations or trades such as: Electrician.

Domestic Appliance Repair.

This electrical engineering qualification provides the foundational competencies required to work on designated electrical circuits and installations. An intermediate set of skills to work on integrated circuits and installations would be acquired at NQF Level 3 with the learner able to work on integrated systems and installations and operate as a skilled worker performing Artisan duties in the electrical field upon graduating at NQF Level 4.

This qualification could assist with the achievement of national government and industrial development policies and strategies to grow a pool of scarce and other related skills in support of sustainable economic growth. People working in the electrical engineering fields require specialized technical skills and knowledge in order to meet the requirements of continually changing environment of the various industries. Through its design, this qualification will meet the needs of learners within the electrical engineering sectors who require technical expertise and essential knowledge needed to earn formal qualifications. This qualification facilitates access for previously disadvantaged groups and other learners to acquire the technical knowledge and skills that are required as well as provide access and mobility into higher-level more specialised occupations. This will allow the learner greater employability and support the development of small and medium enterprises (SME).

LEARNING ASSUMED TO BE IN PLACE

It is assumed that learners are already competent in:

Communication and Mathematical Literacy at NQF Level 1.

Basic concepts of Natural and/or Engineering Science and Technology.

> The term 'Basic' throughout the Qualification refers to 'Base, Fundamental, simplest or lowest in-level' and is consistent in literature dealing with electricity.

Recognition of Prior Learning:

This qualification can be obtained wholly or in part through the recognition of prior learning (RPL). The learner should be thoroughly briefed on the process. Support and guidance should be provided. The process should not be so onerous as to prevent learners from taking up the RPL option in obtaining the qualification.

Access to the Qualification:

Access to this qualification is open. However, it is assumed that learners have completed a National Certificate at NQF Level 1 in a trade-related sub-field or an equivalent qualification. The learner must be physically able to perform the outcomes as specified in the unit standards and be able to differentiate between various colours applicable to the industry.

EXIT LEVEL OUTCOMES

1. Understand the procedures for electrical installations and be able to install electrical equipment and installations and select, use and maintain basic tools.
2. Demonstrate the ability to carry out routine maintenance on electrical equipment and installations.
3. Demonstrate a basic operational knowledge of mathematical, technological and theoretical concepts during the execution of tasks with an ability to read, interpret technical drawings and sketch basic electrical wiring diagrams.
4. Operate safely and efficiently in a working environment.
5. Apply known solutions to familiar and well-defined problems related to working in the electrical engineering field with a basic understanding of forms of energy, energy efficiency and safety and environmental awareness.

Critical Cross-Field Outcomes:

These are embedded in the unit standards, which make up the qualification and are thus also reflected in the Exit Level Outcomes of the qualification.

The critical cross-field outcomes are supported by the exit level outcomes as follows:

Identifying and solving problems in which responses display that responsible decisions using critical thinking have been made:

Solving problems related to the installation and maintenance of electrical machinery, components and circuits.

Working effectively with others as a member of a team, group, organization and community:

All tasks and work-related experience are performed within a team environment.

Taking into account, the safety of others.

Communicating with production, quality control and supervisory personnel and/or clients.

Organising and managing oneself and one's activities responsibly and effectively:

Related to planning and preparation for installation and maintenance activities.

Developing best practice behaviour in work performance and adhering to standard operating procedures.

Focussing on housekeeping, safe practices and care and storage of tools and equipment.

Collecting, analyzing, organizing and critically evaluating information:

Completion of technical reports related to the job activity.

Interpret findings to solve familiar problems during the execution of electrical tasks.

Communicating effectively using visual, mathematical and/or language skills:

Execution of commands and completion of technical reports related to the job activity.

Communicating as a part of a team.

Using science and technology effectively and critically, showing responsibility toward the environment and health of others:

Application of science and technology during the installation and maintenance of electrical machinery, components and circuits.

Relating to the safety of others and paying attention to environmental issues.

Solving problems and applying science and technology to the job activity.

Demonstrate an understanding of the world as a set of related systems by recognizing that problem contexts do not exist in isolation:

Integrating the task with the functionality of electrical installations.

Solving problems through the integration of various sources of information.

Demonstrating and understanding of related systems through the use of general and specific channels of communication when dealing with peers, production, quality control and supervisory personnel and/or clients.

TIME PERIOD

This Learnership can be presented over a period of 12 months

A SELECTION OF THE FOLLOWING UNIT STANDARDS WILL BE COMPLETED IN ORDER TO REACH 140 CREDITS:

UNIT STANDARDS:

	ID	UNIT STANDARD TITLE	PRE-2009 NQF LEVEL	NQF LEVEL	CREDITS
Core	258925	Apply and maintain safety in a working environment	Level 2	NQF Level 02	5
Core	258932	Apply soldering techniques	Level 2	NQF Level 02	2
Core	258935	Design and construct a single phase circuit	Level 2	NQF Level 02	5
Core	12466	Explain the individual`s role within business	Level 2	NQF Level 02	4
Core	259017	Identify, inspect, clean and maintain electrical rotating machines	Level 2	NQF Level 02	6
Core	258957	Identify, inspect, use, maintain and care for engineering hand tools	Level 2	NQF Level 02	6
Core	258960	Install electric wire ways	Level 2	NQF Level 02	6
Core	258942	Install luminaires	Level 2	NQF Level 02	4
Core	258919	Install or replace electrical metering units or measuring instrument	Level 2	NQF Level 02	4
Core	258921	Install, join and terminate Low Voltage cables and conductors	Level 2	NQF Level 02	8
Core	258937	Install, maintain or replace Low Voltage distribution boards, protection devices and components	Level 2	NQF Level 02	6
Core	258962	Maintain transformers	Level 2	NQF Level 02	5
Core	9881	Mark off basic regular engineering shapes	Level 2	NQF Level 02	6
Core	258918	Select, use and care for electrical measuring and testing instruments	Level 2	NQF Level 02	4
Core	10255	Select, use and care for power tools	Level 2	NQF Level 02	5
Core	258967	Understand fundamentals of electricity	Level 2	NQF Level 02	8
Fundamental	119463	Access and use information from texts	Level 2	NQF Level 02	5
Fundamental	9009	Apply basic knowledge of statistics and probability to influence the use of data and procedures in order to investigate life related problems	Level 2	NQF Level 02	3
Fundamental	7480	Demonstrate understanding of rational and irrational numbers and number systems	Level 2	NQF Level 02	3
Fundamental	9008	Identify, describe, compare, classify, explore shape and motion in 2-and 3-dimensional shapes in different contexts	Level 2	NQF Level 02	3
Fundamental	119454	Maintain and adapt oral/signed communication	Level 2	NQF Level 02	5

Fundamental	119460	Use language and communication in occupational learning programmes	Level 2	NQF Level 02	5
Fundamental	7469	Use mathematics to investigate and monitor the financial aspects of personal and community life	Level 2	NQF Level 02	2
Fundamental	9007	Work with a range of patterns and functions and solve problems	Level 2	NQF Level 02	5
Fundamental	119456	Write/present for a defined context	Level 2	NQF Level 02	5
Elective	116932	Operate a personal computer system	Level 1	NQF Level 01	3
Elective	116938	Use a Graphical User Interface (GUI)-based word processor to create and edit documents	Level 1	NQF Level 01	4
Elective	258931	Carry out a close inspection and repair defects on a flameproof enclosure	Level 2	NQF Level 02	2
Elective	258929	Carry out a detailed electrical inspection on an isolated overhead line	Level 2	NQF Level 02	3
Elective	110387	Carry out a detailed inspection on an overhead trolley line	Level 2	NQF Level 02	4
Elective	258939	Carry out basic electric arc welding in an electrical environment	Level 2	NQF Level 02	8
Elective	258920	Carry out basic gas welding, brazing and cutting in an electrical environment	Level 2	NQF Level 02	8
Elective	258936	Construct, maintain and dismantle Low Voltage overhead networks	Level 2	NQF Level 02	10
Elective	265005	Demonstrate an understanding of switchgear assembly	Level 2	NQF Level 02	3
Elective	258928	Demonstrate an understanding of the uses and safety aspect associated with flammable energy sources such as gas	Level 2	NQF Level 02	3
Elective	12465	Develop a learning plan and a portfolio for assessment	Level 2	NQF Level 02	6
Elective	258923	Ensure safety at road works in urban areas	Level 2	NQF Level 02	2
Elective	258938	Handle and care for portable electrical earthing gear and related equipment	Level 2	NQF Level 02	2
Elective	258922	Identify, handle and assemble Medium or High Voltage line hardware and related materials	Level 2	NQF Level 02	4
Elective	258941	Inspect and clean Medium or High voltage yards and enclosures	Level 2	NQF Level 02	2
Elective	258926	Inspect service and maintain a photovoltaic supplied pump	Level 2	NQF Level 02	3
Elective	258927	Install and commission photovoltaic supplied water pump	Level 2	NQF Level 02	3
Elective	10234	Install low voltage transformers	Level 2	NQF Level 02	6
Elective	258917	Maintain batteries, battery rooms or tripping units	Level 2	NQF Level 02	7
Elective	258934	Maintain servitudes, wayleaves and clearances	Level 2	NQF Level 02	5
Elective	12484	Perform basic fire fighting	Level 2	NQF Level 02	4
Elective	12483	Perform basic first aid	Level 2	NQF Level 02	4
Elective	113859	Repair and service small gas appliances	Level 2	NQF Level 02	4
Elective	265007	Demonstrate knowledge of legislation and standards relevant to the switchgear assembly industry	Level 3	NQF Level 03	3

Elective	265034	Demonstrate knowledge of switchgear assembly components and their representation on drawings	Level 3	NQF Level 03	8
Elective	265002	Fabricate and install busbars	Level 3	NQF Level 03	8
Elective	264999	Install earthing systems and shrouding on switchgear assembly	Level 3	NQF Level 03	4
Elective	265008	Modify installed switchgear assemblies	Level 3	NQF Level 03	4