

NOCC-A21 Electrician: Competence Package

Relevant Occupation/trade title: Electrician			SAQA ID: 91761		
Learning Area 6: Install wiring systems and accessories for low voltage in <u>industrial & commercial buildings and premises (incl. earthing and bonding)</u>			Total Hours:	168	
Learning Project 6: Maintain and upgrade low voltage systems and accessories			Total Hours:	32	
Requisite learning areas/projects to be in place (Pre-requisite and co-requisite):	<ul style="list-style-type: none"> • LA 1 (LP 2, 3, 5, 7, 9, 10) • LA 2 (LP1-7) • LA4 (LP 1-3) • LA5 (LP 1-5) • LA6 (LP1-4) 				
Learning project description: Maintain and upgrade low voltage systems and accessories					
Activity phase	Practical Skills Modules Content	Underpinning Knowledge Module Content	Work Experience Module Content (Exposure to be given)	Didactical-methodological advice	Learning Materials / Tools and Equipment
Reference to QCTO Curriculum	PM-05-PS06 PM-06-PS01-02 PM-07-PS01-03 PM-08-PS01-05	KM-05-KT01 KM-05-KT02 KM-05-KT03	WM-01-WE01-03 WM-02-WE01-03 WM-03-WE01-03 WM-05-WE01-03		
Planning/ Preparation	<p>Provide access to (Given): Work tasks/job cards, existing installations and materials and equipment as listed in last column;</p> <p>Apprentices must be able to do/perform the following (hard and soft) skills:</p> <p>Prepare for the maintenance and upgrading of industrial LV installation systems</p> <ul style="list-style-type: none"> • Obtain, identify and understand statutory requirements for a given work 	<p>Knowledge of:</p> <ul style="list-style-type: none"> • Occupational health and safety requirements (OHS Act) • Accident prevention & first aid • Installation standards (SANS 10142-1) • Schematic drawings and manufacturers specifications • Equipment will include, but are not limited low voltage pole mounted isolators, circuit breakers, 	<p>Under supervision:</p> <ul style="list-style-type: none"> • Conduct regular OHS instructions and talks as required by law • Obtain information about the work assignment according to instructions or breakdown reports where necessary • Maintenance task instructions are interpreted and sequence of operations is determined and communicated to work 	<ul style="list-style-type: none"> • Research /Desk study • Case studies /scenarios • Technical discussions • Lecture/ instructions • Textbook work • Mind mapping • Practical simulation work 	<p>Print materials, electronic files, software applications incl.:</p> <ul style="list-style-type: none"> • OHS Act • SANS 10142-1 • Text books • Manufacturer maintenance manuals • Training manuals for trainers and apprentices incl. multimedia software • Fault simulation

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	<p>area</p> <ul style="list-style-type: none"> Identify and establish health and safety risks and follow risk control measures and procedures in preparation for the work Prepare maintenance and upgrade work in consultation with others affected by the work and sequence appropriately Determine the scope and location of the maintenance and upgrade work to be undertaken from documentation or appropriate personnel Verify that the scope of the design specifications are of the latest version and are confirmed with appropriate personnel Obtain and check material needed for the maintenance and upgrade work against job requirements Obtain and check tools, equipment and measuring devices needed for the maintenance and upgrade work for correct operation and safety 	<p>transformers, surge arrestors</p> <ul style="list-style-type: none"> Maintaining and upgrading of low voltage systems and accessories. Steps and phases of processing customer orders Documentation of findings and conversation results Interpretation of electrical schematic drawings Compilation of material lists Required work equipment and tools Energy consumption of wiring systems and accessories (low voltage) Dimensioning, types, labelling and characteristics of wiring systems and accessories (low voltage) installation components Work organisation and work process planning Energy and resource efficiency Overview of applicable protective measures Recycling and environment protection Sourcing of installation materials 	<p>team members</p> <ul style="list-style-type: none"> Assess work conditions and implement safety measures according to safe work procedures Ensure that the affected section of the low voltage system is isolated and prepared for maintenance and upgrading Select, inspect and check equipment, test instruments, tools and personal protective equipment for functionality and safety prior to commencement of tasks Initially perform preparatory works under direct and constant supervision of a qualified Electrician Undertake all preparatory installation activities without assistance but regular supervision Obtain access to building sites for maintaining and upgrading low voltage systems and accessories 		<p>software for electrical installations</p> <ul style="list-style-type: none"> Set of presentation aids (videos, slides) for overhead or LED/LCD projectors <p>Stationary machinery, mobile plants, transport, access and lifting equipment incl.:</p> <ul style="list-style-type: none"> Hoisting and lifting gear Ladders and scaffolds <p>Hand- & power tools and PPE incl.:</p> <ul style="list-style-type: none"> Standard electrician's toolbox Electrical drilling machine/hammer with set of drill bits and chisels Electrical grinder Electrical wall chaser Hand conduit benders Electrical heat gun and bending springs Pipe cutter Safety gloves Protective goggles
<p>Implementation/ Execution</p>	<p>Conduct maintenance and upgrading of industrial LV installation systems</p> <ul style="list-style-type: none"> Follow risk control measures and procedures for carrying out the work 	<ul style="list-style-type: none"> Spectrum of basic maintenance and upgrading activities Types and forms of maintaining and upgrading 	<ul style="list-style-type: none"> Ensure that that the circuit/installation is isolated and locked out Source needed materials, personal protective 		<p>Measuring and testing instruments incl.:</p>

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<ul style="list-style-type: none"> • Ensure that that the circuit/installation is isolated and locked out • Evaluate current system performance against expected performance (Inspection/fault finding) • Maintain system equipment by using appropriate plans, drawings and instructions • Reset and/or carry out required adjustments to ensure equipment operates within parameters • Apply logical diagnostic methods to identify industrial installation system, circuit and component faults/ defects using all necessary measurements and estimations of operating parameters referenced to system operational requirements • Upgrade the industrial installation by extending existing and/or changing obsolete/faulty components in line with work order specifications and respective installation procedures • Test suspected fault scenarios as being the source of industrial LV system problems • Identify and appropriately document source of the fault/ defect • Dismantle industrial 	<p>low voltage systems and accessories</p> <ul style="list-style-type: none"> • Testing/measuring of the low voltage electrical systems (Ocular inspection, continuity test, voltage test...) • Fault finding methods/ techniques • Preventative maintenance methods and techniques • Techniques and methods for repairing LV systems • Techniques and methods for upgrading LV systems • Work procedures and work documents related to the maintenance and upgrading of LV systems • Handing over of low voltage systems and accessories 	<p>devices, tools, measuring instruments and equipment</p> <ul style="list-style-type: none"> • Perform maintaining and upgrading of low voltage systems and accessories in various work contexts with assistance and under direct and constant supervision until competent • Maintain and upgrade low voltage systems and accessories without assistance but regular supervision • Test and repair maintained and upgraded low voltage systems and accessories under close supervision until work can be done on a more autonomous basis • Conduct re-commissioning quality checks after maintenance, upgrading and necessary corrective action is taken • Engage in regular housekeeping activities, tool and equipment maintenance • Provide work documentation, verbal and written reports as required by the company 	<ul style="list-style-type: none"> • Insulation tester • Phase rotation indicator/tester • Plug Polarity (Socket) Tester • Analogue and Digital Multimeter • Clamp meter • Voltage and continuity tester • AC Leakage current clamp meter • Measuring tape • Steel ruler • Steel square • Spirit level <p>Training workshop and laboratory equipment incl.:</p> <ul style="list-style-type: none"> • Heavy workbench with stool, power supply and assembly vice • Bench mountable interchangeable training panel frame • Mountable punched hole frame and front panel frame • Basic panel systems for practicing installation and control technology with built in fault simulator exercises • Modular
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	<p>installation system and components where necessary to gain access</p> <ul style="list-style-type: none"> • Source and obtain materials/ replacement components required to rectify faults/defects • Replace, adjust and secure faulty/defect components and equipment • Identify and forward reusable, faulty or worn components that can be repaired to other appropriate personnel • Test effectiveness of industrial system repair and/or upgrade • Reassemble system components, finally test and prepare them to go back into service 				<p>experimental box system for practicing installation and control technology</p> <ul style="list-style-type: none"> • Training packages for control technology/ switching system installations • Set of various industrial machines, lighting circuits and systems, socket outlet circuits, equipped distribution boards for fault finding exercises
<p>Evaluation/ Documentation</p>	<p>Complete the maintenance and upgrading work of industrial installation Systems</p> <ul style="list-style-type: none"> • Complete work and notify appropriate personnel • Conduct housekeeping activities • Clean and check tools, and equipment • Store tools and equipment in designated locations • Return to storage or dispose of any surplus resources and materials • Process and finalise works completion records, reports, 				

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	modified drawing and/or documentation and information <ul style="list-style-type: none"> • Hand over maintained or upgraded electrical system and components • Brief appropriate personnel about the undertaken system and component changes • Complete relevant documents 				
Total	Hours: 32				
Specialisation additions					
Assessment guidance					
<p>Criteria for assessment:</p> <ul style="list-style-type: none"> • Identifying early warning signs of equipment needing attention or having potential problems • Identifying and analysing the range of possible causes and determining the most likely cause • Taking appropriate action to ensure a timely return to full performance • Recognising obvious problems in related system areas and making appropriate contributions to their solution • Interpreting a range of electrical drawings and schematics and of manufacturer specifications in order to undertake required maintenance or identified repairs/modifications to electrical systems • Using methodical fault finding techniques • Applying of correct testing technics to comply with statutory regulations and manufacturers specifications. • Finding and rectifying faults efficiently • Upgrading and replacing of system components to meet customer demands and to facilitate a sustainable and efficient system operation • Completing documentation correctly • Dealing with unplanned events • Cleaning and storing of tools and equipment 					