Relevant Occupation/trade title: Electrician	**SAQA ID:** 91761	
Learning Area 2: Identify, care and use of basic, trade-specific hand- & power tools and equipment	**Total Hours:**	**192**
Learning Project 3: Select and perform trade-specific oxy-fuel cutting and arc welding procedures	**Total Hours:**	**40**
Requisite learning areas/projects to be in place (Pre-requisite and co-requisite):	• LA 1 (LP 1, 2, 6, 7, 9)	
Learning project description: Select and perform trade-specific oxy-fuel cutting and arc welding procedures (e.g. install cable trays plant)		

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	PM01-PS05 (Arc Welding) PM01-PS06 (Gas cutting)	KM-02-KT01	WM-None		
Planning/ Preparation/	**Provide access to (Given):** Learning materials/Tools and Equipment given in last column and different trade specific work scenarios which require oxy-fuel cutting and arc welding **Apprentices must be able to do/perform the following (hard and soft skills):** **Plan and prepare trade-specific oxy-fuel cutting procedures** • Cutting requirements are identified from plans and specifications • Develop a work plan • Conduct basic risk assessment • Identify applicable PPE • Determine and analyse	**Knowledge of:** • Types, application and functions of various arc welding machines and equipment • Application of various types of electrodes and current settings during the arc welding process • Types, application and functions of oxy-fuel cutting equipment • OHSA requirements and workplace procedures relating to performing oxy-	**Under supervision:** *If the workplace allows for this exposure* • Participate in safety talks related to oxy fuel cutting and arc welding • Select appropriate PPE prior to performing oxy fuel cutting and arc welding tasks • Inspect and arrange oxy fuel cutting and arc welding equipment before the commencement of work • Complete registers • Perform basic oxy fuel cutting related to work assignments	• Research /Desk study • Case studies /scenarios • Technical discussions • Lecture/ instructions • Textbook work	**Print materials, electronic files, software applications incl.:** • Text books • Training manuals for trainers and apprentices incl. multimedia software • Set of presentation aids (videos, slides) for overhead or LED/LCD projectors **Stationary machinery, mobile plants, transport, access and lifting equipment incl.:** • Oxygen and

	characteristics of required gas cutting techniques • Identify gas cutting equipment and materials for the work assignment and check their serviceability • Prepare work area to support efficient oxy- cutting processes **Plan and prepare trade-specific arc welding procedures:** • Welding requirements are identified from plans and specifications • Develop a work plan • Conduct basic risk assessment • Identify applicable PPE • Determine and analyse characteristics of required welding techniques • Identify welding equipment and materials for the work assignment and check their serviceability • Prepare work area to support efficient welding processes	acetylene cutting manual metal arc welding • Personal protective equipment (PPE) for oxy-acetylene cutting and arc welding • Types of materials that can be welded using manual metal arc welding • Dangers of high pressure settings with oxy acetylene equipment • Operating principles of oxy-acetylene equipment • Health and safety risks from high temperatures on materials • Work completion procedures and work documents related to oxy-acetylen cutting and arc welding • Material preparation techniques for manual metal arc welding • Methods for identifying and repairing weld defects • Manual metal arc welding distortion control techniques	• Perform basic arc welding tasks related to work assignments		acetylene gas regulators, gas cylinders, trolley, flashback arrestors, rubber gas hoses and clamps, cutting torches, nozzles, and accessories • Portable electrical arc welding machine, welding cables, electrode holder, earth clamp and accessories **Hand- & power tools and PPE incl.:** • Metal marking tools • Chipping hammer • Wire brush PPE: • Welding helmet, welding goggles • Safety Apron • Safety gloves • Safety boots • Safety spats **Measuring and testing instruments incl.:** • Steel ruler • Combination square **Training workshop and laboratory equipment incl.:**
Implementation/ Execution/	**Perform oxy-acetylene cutting** • Adhere to occupational health and safety (OSHA) and environmental requirements associated with cutting with oxy-acetylene throughout the work • Set up and prepare Oxy-acetylene cutting equipment • Prepare materials for cutting according to plans and specification				

	• Practice basic gas cutting techniques on sample pieces • Select appropriate tip size for the materials to be cut • Adjust cutting pressures for the materials to be cut • Mark out and clamp materials prior to cutting • Set flame and perform cuts according to the specified cutting procedures to effect a clean cut • Visually inspect completed cuts for compliance with job specifications **Perform arc-welding** • Location of welds is identified according to workplace procedures and job specifications • Clean and prepare materials for welding • Set up and prepare welding equipment and select correct electrodes • Apply basic arc welding techniques according to plans and specifications using safe welding practices • Confirm weld quality and identify defects by inspection	• Metal arc weld inspection and testing procedures • Welding standards applicable to manual metal arc welding • Procedures for operating oxy-acetylene working pressure gauges for cutting operations • Different oxy-acetylene flames and their application • Procedures for using oxy-acetylene cutting equipment and associated safety requirements • Techniques for repairing cutting defects			• Welding cubicle with mounting fixtures and curtain • Welding screens • Welding table • Fume exhaust system • Fire extinguisher Workbench for practical exercises with metal top
Evaluation/ Documentation/ Housekeeping	**Complete and evaluate the welding and cutting work** • Evaluate work completed according to work instructions • Work pieces are cleaned using appropriate techniques according to work instructions				

	• Work area is cleared and materials disposed of, reused or recycled • Cutting and welding equipment is cleaned, maintained and stored • Tools and accessories are cleaned, checked, maintained and stored • Faulty equipment is identified, tagged and reported				
Total	Hours: 40				
Specialisation additions		Mining General safety OHSA			

Assessment guidance

Self assessment
Group assessment
Observation and combined theory test

Criteria for assessment:

- Manufacturing of work piece e.g. cable tray and angle bracket according to set specifications and quality standards
- Performing gas cutting and arc welding operations in compliance with legislation and standard operating procedures

Internal assessment criteria as per QCTO: PS05 and PS06