Model Curriculum

NAME: FUNDAMENTALS OF SAFETY MEASURES IN ELECTRICAL SWITCHGEAR & PROTECTIVE DEVICES

MICROCREDENTIAL CODE: SSD/M0108

MICROCREDENTIAL VERSION: 1.0

NSQF LEVEL:4

MODEL CURRICULUM VERSION-1.0

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Training Parameter

Sector	Education, Training & Research; Hydrocarbon, Iron & steel, Mining, Power, Automotive, Construction, Chemicals & Petrochemicals and others.
Sub Sector	-
Occupation	Electrical Safety Management
Country	India
NSQF Level	4
Minimum Educational Qualification and Experience	12th grade pass or equivalent OR 10th grade pass or equivalent with 3 years of relevant experience OR Previous relevant qualification of NSQF level 3 with 3 years of relevant experience
Pre-Requisite License or Training	NA
Minimum Age	NA
Last Reviewed On	08-05-2025
Next Review Date	08-05-2028
NSQC Approval Date	08-05-2025
MC Version	1.0
Model Curriculum Creation Date	08-05-2025

Model Curriculum Valid Up to Date	08-05-2028
Model Curriculum Version	1.0
Minimum Duration of the Course	7.5 hours
Maximum Duration of the Course	7.5 hours

Program Overview

This section summarizes the end objectives of the program along with its duration.

Training Outcomes

After completing the program, the participant will be able to: -

- Determine any faults in the system or an abnormality in the system parameters.
- Determine the parameters that needs metering & regulating
- Identify the type of protection device or electrical switchgear to be used
- Introduce physical modifications to the workplace that will effectively minimize or eliminate the risk of faulty conditions in electrical power circuits.
- Obtain knowledge about appropriate grounding methods and protective measures. Educate yourself on safe practices when using household appliances and electronic devices.
- Maintain continuous compliance with electrical power circuit safety regulations by conducting regular reviews.

Compulsory Modules

The table lists the modules and their duration corresponding to the Compulsory NOS of the QP

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
SSD/M0108: Fundamentals Of Safety Measures In Electrical Switchgear & Protective Devices Micro credential Version No.1 NSQF Level 4	**04:00 Hours**	**3.5:00Hours**	**00:00 Hours**	**00:00 Hours**	**7.5:00 Hours**
Module 1: Electrical Risk Assessment and Implementation of Safety Measures	02:00 Hours	02:00 Hours	00:00 Hours	00:00 Hours	04:00 Hours
Module 2: Electrical Systems and Workplace Safety Processes	02:00 Hours	1.5:00 Hours	00:00 Hours	00:00 Hours	3.5:00 Hours
Total Duration	**04:00 Hours**	**3.5:00 Hours**	**00:00 Hours**	**00:00 Hours**	**7.5:00 Hours**

Module Details

Module 1: Electrical Risk Assessment and Implementation of Safety Measures

Terminal Outcomes:

- Demonstrate the ability to identify potential electrical hazards through a comprehensive assessment.
- Apply proper grounding techniques and protective measures effectively when dealing with electrical systems.
- Execute safe practices for using electrical appliances and devices, ensuring adherence to established safety guidelines.
- Effectively implement emergency procedures and fire prevention measures related to electrical incidents.
- Adhere to relevant codes, regulations, and standards for electrical safety in residential settings consistently.

Duration: 02:00 Hours	**Duration: 02:00 Hours**
Theory–Key Learning Outcomes	**Practical–Key Learning Outcomes**
• Understand the key principles of electrical safety. • Identify common electrical hazards in various environments. • Conduct electrical safety assessments. • Implement appropriate safety measures and control systems. • Comply with electrical safety regulations and standards (e.g., OSHA, NFPA 70E, IEC). • Perform basic electrical safety audits. • Conduct Visual inspections of wiring, equipment, and protective devices. Testing insulation resistance, grounding, and circuit continuity • **Explain** the critical steps to be taken after an electrical shock incident, including:How to assess and secure the area to prevent further injuries; How to check and respond to a victim's condition • Explain How to communicate effectively with emergency responders by providing essential details	• Conduct electrical safety assessments in a variety of environments. • Identify potential electrical hazards and implement preventive measures. • Apply proper Lockout/Tagout (LOTO) procedures. • Use electrical testing tools safely and correctly. • Perform basic electrical audits and document safety practices • Inspect wiring, cables, and electrical components for signs of wear, damage, or overheating. • Review the steps of LOTO: preparation, shutdown, isolation, locking, tagging, verification. • Conduct a walkthrough of a simulated worksite containing common electrical hazards (e.g., exposed wiring, improper grounding, overloaded circuits). • Use risk assessment matrices to evaluate the likelihood and severity of potential electrical incidents. • Simulate work tasks involving energized electrical equipment (e.g., switching operations, circuit breaker maintenance).

• Explain How to conduct a hazard review, implement Corrective and Preventive Actions (CAPA), and revise electrical safety protocols based on investigation findings.	• Inspect electrical systems for compliance with safety standards (e.g., OSHA, NFPA 70E). • Quickly and safely secure an electrical incident scene by isolating the power source, • Correctly assess a victim's condition and place an unconscious but breathing victim into the recovery position • Communicate an emergency call effectively, providing clear and accurate information about the nature of the incident, and • Participate in a simulated hazard review, propose appropriate CAPA measures, and recommend revisions to electrical safety procedures based on case study findings.
Classroom Aids	
Charts, Models, Video presentation, Flip Chart, Whiteboard/Smart Board, Marker, Board eraser	
Tools, Equipment and Other Requirements	
Personal Protective Equipment (PPE), Multimeters, Clamp Meters, Voltage Testers, Phase Sequence Indicators, Non-contact voltage testers, Megohmmeters, Insulation Resistance Testers, Ground Resistance Testers, Circuit Breaker Test Sets, Emergency Showers and Eyewash Stations, Fire Extinguishers, First Aid Kits, Emergency Response Kits, Lockout/Tagout (LOTO) Kits, Circuit Tracers and Analysers, Insulated Hand Tools, Portable Generators and Backup Power Supplies, Grounding and Bonding Equipment, Cable Pullers and Fish Tapes, Voltage and Current Calibrators.	

Module 2: Electrical Systems and Workplace Safety Processes

Terminal Outcomes:

- Determine the parameters that needs metering & regulating
- Identify the type of protection device or electrical switchgear to be used
- Introduce physical modifications to the workplace that will effectively minimize or eliminate the risk of faulty conditions in electrical power circuits.

Duration: 02:00 Hours	**Duration: 1.5:00 Hours**
Theory–Key Learning Outcomes	**Practical–Key Learning Outcomes**

• Understand the components of electrical systems and how to manage them safely. • Identify common electrical hazards in the workplace and implement risk control measures. • Develop and implement preventive maintenance programs for electrical systems. • Comply with electrical safety standards (e.g., OSHA, NFPA 70E, IEC). • Manage emergency responses and electrical incident reporting. • Foster a safety culture in the workplace by promoting awareness and safe work practices. • Conduct Routine inspections and testing (e.g., insulation resistance testing) & Calibration of protective devices (circuit breakers, relays) • Devise Safe Work Practices and Personal Protective Equipment for De-Energized Equipment; Energized Equipment; and Confined Space Electrical Work • Plan for services like First Aid for Electrical Injuries & Firefighting in Electrical Emergencies • Describe the types of switchgears used in Low Voltage (LV), Medium Voltage (MV), and High Voltage (HV) systems. • Explain the causes of surges (e.g., lightning, switching operations) and their impact on switchgear and electrical systems. • Illustrate how protective devices (relays, circuit breakers, fuses) safeguard equipment and enhance power quality. • Discuss trends such as remote monitoring, IoT-enabled switchgear, condition-based maintenance, and digital twin modeling.	• Perform inspections of electrical systems and identify hazards. • Conduct preventive maintenance on electrical systems and protective devices. • Safely manage electrical systems by applying Lockout/Tagout (LOTO) procedures. • Respond effectively to electrical incidents and emergencies. • Implement workplace safety measures, including the use of personal protective equipment (PPE). • Conduct basic electrical safety audits and document findings. • Identify and select appropriate switchgear for LV, MV, and HV systems based on given scenarios or specifications. • Install and test surge protection devices (SPD) in coordination with switchgear. • Perform testing procedures to verify relay operation and circuit breaker functionality. • Set up communication between smart switchgear components and a centralized SCADA or smart grid system
Classroom Aids	
Charts, Models, Video presentation, Flip Chart, Whiteboard/Smart Board, Marker, Board eraser	
Tools, Equipment and Other Requirements	
Personal Protective Equipment (PPE), Multimeters, Clamp Meters, Voltage Testers, Phase Sequence Indicators, Non-contact voltage testers, Megohmmeters, Insulation Resistance Testers, Ground Resistance Testers, Circuit Breaker Test Sets, Emergency Showers and Eyewash Stations, Fire Extinguishers, First Aid	

Kits, Emergency Response Kits, Lockout/Tagout (LOTO) Kits, Circuit Tracers and Analysers, Insulated Hand Tools, Portable Generators and Backup Power Supplies, Grounding and Bonding Equipment, Cable Pullers and Fish Tapes, Voltage and Current Calibrators.

Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training Experience**		**Remarks**
		Years	**Specialization**	**Years**	**Specialization**	
ITI/12th Pass	Any domain	12	Relevant Domain	0	-	
Graduate in any discipline / Diploma in Engineering	Any domain	7	Relevant Domain	0	-	
M. Tech/ B. Tech	Any domain	4	Relevant Domain	0	-	

Trainer Certification	
Domain Certification	**Platform Certification**
Certified as Trainer for the Job Role: "SSD/M0108 v1.0 :Fundamentals of Safety Measures in Electrical Switchgear & Protective devices" or higher qualification as per career progression by SSDF. The minimum accepted score is 80%.	Recommended that the Trainer is certified for the Job Role: "Trainer (VET and Skills)", mapped to the Qualification Pack: "MEP/Q2601 v2.0". The minimum accepted score is 80%.

Assessor Requirements

Assessor Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training/Assessment Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
ITI/12th Pass	Any domain	12	Relevant Domain	0	-	
Graduate in any discipline / Diploma in Engineering	Any domain	7	Relevant Domain	0	-	
M. Tech/ B. Tech	Any domain	4	Relevant Domain	0	-	

Assessor Certification	
Domain Certification	**Platform Certification**
Certified as Assessor for the Job Role: "SSD/M0108 v1.0 :Fundamentals of Safety Measures in Electrical Switchgear & Protective devices" or higher qualification as per career progression by SSDF. The minimum accepted score is 80%.	Recommended that the Assessor is certified for the Job Role: "Assessor (VET and Skills)", mapped to the Qualification Pack: "MEP/Q2701 v2.0". The minimum accepted score is 80%.

Assessment Strategy

The assessment will be based on the concept of third-party assessments through certified assessors with empaneled Assessment Agencies of NCVET. The certification of each assessor will be done by SSDF through a process of selection, training, assessment & certification through training of assessor's program.

The assessments will include both formative & summative. The progressive assessments will be through the trainer during the progress of the training. Summative assessments will be carried out by an assessor through assessment agencies.

The assessment process will determine whether the candidate or professional is competent or not to perform the job as per expected performance criteria. The assessment plan contains the following information:

a) Assessment elements – Competencies based on performance criteria of each NOS.
b) Methods of assessment – Written test (online/offline), viva and practical/ field exercises.
c) Time of assessment – The assessment will be done both formative and summative (post orientation/training) of candidates.
d) Place i.e., context of the assessment - The assessment will be conducted through theory, viva voce and practical/ field exercises, on simulators and will be both online and offline modes.
e) The criteria for decision making– It will be based on assessment criteria & guidelines as given in the qualification pack.
f) Questions – The written questions, viva & practical questions will be set to cover all aspect of performance criteria and would have been validated from experts in the subject matter.

Glossary

Term	Description
Declarative Knowledge	Declarative knowledge refers to facts, concepts and principles that need to Be known and/or understood to accomplish or to solve a problem.
Key Learning Outcome	Key learning outcome is the statement of what a learner needs to know, understand and be able to do to achieve the terminal outcomes. A set of key learning outcomes will make up the training outcomes. Training Outcome is specified in terms of knowledge, understanding(theory)and skills (practical application).
OJT(M)	On-the-job training(Mandatory);trainees are mandated to complete specified hours of training on site
OJT(R)	On-the-job training(Recommended); trainees are recommended the specified hours of training on site
Procedural Knowledge	Procedural knowledge addresses how to do something, or how to perform a task. It is the ability to work or produce a tangible work output by applying. cognitive, affective, or psycho motor skills.
Training Outcome	Training outcome is a statement of what a learner will know, understand and be able to do upon the completion of the training.
Terminal Outcome	Terminal outcome is a statement of what a learner will know, understand and be able to do upon the completion of a module. A set of terminal outcomes helps to achieve the training outcome.

Acronyms and Abbreviations

Term	Description
QP	Qualification Pack
NSQF	National Skills Qualification Framework
NSQC	National Skills Qualification Committee
NOS	National Occupational Standard
AB	Awarding Body
AA	Assessment Agency
TP	Training Partner