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

MC CODE:SSD/M0108

VERSION:1.0

NSQF LEVEL:4

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MC Description

The MC deals with the various devices employed for the purpose of switching, controlling, and safeguarding electrical power circuits, as well as different types of electrical equipment by detecting any faulty conditions within the system through protection relays. Switchgear encompasses circuit breakers, current transformers, voltage transformers, protection relays, measuring instruments, electrical switches, electrical fuses, miniature circuit breakers, lightning arresters or surge arresters, electrical isolators, and other related equipment.

Parameters

Developed by	:	Safety Skill Development Foundation
MC Code	:	SSD/M0108
MC name	:	**Fundamentals of Safety Measures in Electrical Switchgear & Protective devices**
NSQF Level	:	4
Used by Sectors	:	Hydrocarbon, Iron & steel, Mining, Power, Automotive, Construction, Chemicals & Petrochemicals and others.
Occupation	:	Electrical Safety Management
Country	:	India
Minimum Job Entry Age	:	18 years

Minimum Educational Qualification & 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
Training Duration	:	Training – 7.5 hours and Assessment – 0.5 hours
NSQC Approval Date	:	08-05-2025
Next Review Date	:	08-05-2028
Version	:	1.0
Reference code on NQR	:	NM-04-ET-04311-2025-V1-SSDF
NQR Version	:	1.0

Scope

- Faults in the electrical system or an abnormality in the system parameters.
- Devices for switching, controlling, and safeguarding electrical power circuits.
- Type of protection device or electrical switchgear to be used and parameters that needs metering & regulating.
- Measures to effectively minimize or eliminate the risk of faulty conditions in electrical power circuits and safe practices when using household appliances and electronic devices.

Performance Criteria

The certified professional on this MC will be able to understand:

PC1. Identify faults or abnormality in electrical system, recognise potential hazards and understand key parameters for monitoring and measurement.

PC2. Classify different types of switchgear (LV, MV, HV) and their functions.

PC3. Identify the purpose and importance of various switching, controlling and safeguarding devices in electrical systems

PC4. Apply proper grounding techniques and protective measures effectively when dealing with electrical systems.

PC5. Demonstrate basic inspection and maintenance procedures for switchgear components.

PC6. Apply emergency measures & procedures and fire prevention measures on failure of electrical controlling devices.

PC7. Adhere to relevant codes, regulations, and standards for electrical safety.

PC8. Implement safety measures in switchgear operation and use appropriate PPEs & safety tools.

PC9. Identify the working principles of circuit breakers, relays, and fuses .

PC10. Use protection mechanisms against overloads, short circuits, and earth faults.

PC11. Assess and secure the area to prevent further injury (e.g., switch off the power source if safe to do so) from electrical shocks

PC12. Check the victim's responsiveness, breathing, and pulse immediately.If unconscious but breathing, place the victim in the recovery position

PC13. Inform the designated emergency response team or call local emergency services without delay.Provide clear details about the incident, including the type of electrical shock (high-voltage/low-voltage).

PC14. Conduct a hazard review and implement corrective and preventive actions (CAPA).Revise relevant electrical safety protocols based on investigation findings.

Knowledge and Understanding (KU)

The certified professional on this MC will be able to know and understand followings:

KU1. Various faults & measurable parameters in the electrical system

KU2. Understand various switches, controlling & safeguarding devices and their purpose in the system.

KU3. Understand safe practices, grounding techniques for the electrical devices.

KU4. Understand safety measures & safe practices for using electrical appliances and devices.

KU5. Knowledge of safety guidelines and emergency measures & procedures for electrical devices.

KU6. Understanding of relevant codes, regulations, and standards for electrical safety.

KU7. Knowledge of PPEs and safety tools while dealing with electrical devices.

KU8. Understand the importance of scene safety before attempting rescue.

KU9. Know methods to disconnect or isolate electrical power safely (e.g., using circuit breakers, main switches).

KU10. Basic knowledge of first aid protocols: how to check responsiveness (using AVPU scale: Alert, Voice, Pain, Unresponsive).

KU11. Understand internal emergency reporting protocols and escalation hierarchy.

KU12. Familiarity with emergency contact numbers and how to guide emergency responders to the scene efficiently.

KU13. Understanding of Root Cause Analysis (RCA) and how to use findings to develop CAPA.

KU14. Knowledge of how to update or revise electrical safety protocols and safe work procedures.

Generic Skills (GS)

The certified professional on this MC should know followings for better performance:

GS -1 Reading and writing in the language of communication.

GS -2 Effective verbal communication in the local language.

GS -3 Mathematics and utilizing Analysing processes & tools.

GS -4 Planning, organizing, and optimizing resources and utilizing planning and monitoring tools, as well as operating software

GS-5 Administration, decision making, and conflict resolution.

GS -6 Understanding of rules & regulations and adherence to instructions

GS -7 Understanding safety measures and adhering to safety protocols.

GS-8 Demonstrating professional behaviour when interacting with co-workers and employees.

GS -9 Proper utilization of personal protective equipment.

Assessment Criteria

Performance Criteria	Theory marks	Practical marks	Project Marks	Viva marks	Total marks
PC-1: Identify faults or abnormality in electrical system, recognise potential hazards and understand key parameters for monitoring and measurement.	3	4	-	-	7
PC-2: Classify different types of switchgear (LV, MV, HV) and their functions..	3	4	-	-	7
PC-3: Identify the purpose and importance of various switching, controlling and safeguarding devices in electrical systems	3	4	-	-	7
PC-4: Apply proper grounding techniques and protective measures effectively when dealing with electrical systems.	3	5	-	-	8
PC-5: Demonstrate basic inspection and maintenance procedures for switchgear components.	3	4	-	-	7
PC-6: Apply emergency measures & procedures and fire prevention measures on failure of electrical controlling devices.	3	4	-	-	7
PC-7: Adhere to relevant codes, regulations, and standards for electrical safety.	3	4	-	-	7
PC-8:Implement safety measures in switchgear operation and use appropriate PPEs & safety tools.	3	4	-	-	7
PC-9:Identify the working principles of circuit breakers, relays, and fuses	3	4	-	-	7
PC-10 Use protection mechanisms against overloads, short circuits, and earth faults	3	5	-	-	8
PC 11 Assess and secure the area to prevent further injury (e.g., switch off the power source if safe to do so) from electrical shocks	3	4	-	-	7
PC 12 Check the victim's responsiveness, breathing, and pulse immediately.If unconscious but breathing, place the victim in the recovery position	3	4	-	-	7

PC 13 Inform the designated emergency response team or call local emergency services without delay.Provide clear details about the incident, including the type of electrical shock (high-voltage/low-voltage).	3	4	-	-	7
PC 14 Conduct a hazard review and implement corrective and preventive actions (CAPA).Revise relevant electrical safety protocols based on investigation findings.	3	4	-	-	7
MC Total Marks	**42**	**58**			**100**

Guidelines for Assessment

- The assessment criteria given is for Micro credential "**Fundamentals of Safety Measures in Electrical Switchgear & Protective devices**."
- Assessments can be carried out offline as well as online and shall be carried out by SSDF only.
- Questions will be formed in such a way as to provide an outcome on maximum Performance Criteria.
- The assessment will be of half an hour duration and will be based on multiple choice questions created / approved by the SSDF.
- The certificate on MC will be issued to successful candidates who score 50% or more than 50%.

Acronyms

SSDF	Safety Skill Development Foundation
NCVET	National Council for Vocational Education and Training
NSQF	National Skill Qualifications Framework

MC	Micro Credential
NOS	National Occupational Standards
QP	Qualification Pack

Glossary

Key Words	Description
Safety Skill Development Foundation (SSDF)	An Awarding Body recognized by NCVET, Ministry of Skill Development & Entrepreneurship, Government of India.
NCVET (National Council for Vocational Education and Training)	Regulatory Authority of Government of India for Vocational Education and Training.
NSQF (National Skill Qualifications Framework)	National Skill Qualifications Framework is a framework under which skills are categorized from level 1 to 10.
Sector	Sector is conglomeration of different business operations having similar business and interests.
Sub-Sector	Sub-Sector is further breakdown of Sector based on the characteristics and business components.

Occupation	Occupation is a set of job roles requiring similar/related competencies in the industry.
Job role	Job role is a set of functions required to get an employment opportunity in the industry and perform a task as per industry norms.
Qualifications Pack (QP)	Qualifications Pack comprises the set of Occupational Standard, required to perform a job role and is assigned a unique qualification pack code.
National Occupational Standards (NOS)	NOS are Occupational Standards in the Indian context and approved by NCVET.
Micro Credential (MC)	A coherent set of skills, knowledge, and learning outcomes, needed by industry, employers, Government, or the community.
Performance Criteria (PC)	Performance Criteria are statements specifying the standard of performance required when carrying out a task.
Knowledge and Understanding (KU)	Knowledge and Understanding (KU) are statements which together specify the technical, professional, and organizational specific knowledge that an individual, needs to perform to the required standard.
Generic Skills (GK)	Generic Skills are a group of skills typically needed in general to perform the task.
MC/NOS/QP Codes	MC/NOS/QP codes are unique identifier codes for MC/NOS/QP which starts from M/N/Q respectively