Model Curriculum

QP Name: Mine Electrician

Electives: Underground Metal/ Opencast/ Underground Coal/ Rare Earth Plant

Options: Underground Installation/ Rare Earth Installation

QP Code: MIN/Q3101

QP Version: 2.0

NSQF Level: 4

Model Curriculum Version: 2.0

Skill Council For Mining Sector || B-311, Okhla Industrial Area, Phase – I, New Delhi – 110020,
Website: www.skillcms.in

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Training Parameters

Sector	Mining
Sub-Sector	Engineering Services
Occupation	Electrical Services
Country	India
NSQF Level	4
Aligned to NCO/ISCO/ISIC Code	NCO-2015/7411.0200
Minimum Educational Qualification and Experience	8th grade pass plus 2-year NTC plus 1 Year NAC OR 8th pass plus 1-year NTC plus 1-Year NAC plus CITS OR 10th grade pass and pursuing continuous schooling OR 10th grade pass with 2 years relevant experience OR Previous relevant Qualification (Jr. Mine Electrician) of NSQF Level 3.0 with minimum education as 5th Grade pass with 2 years relevant experience
Pre-Requisite License or Training	Valid gas testing certificate (only for underground coal mines)
Minimum Job Entry Age	20 years
Last Reviewed On	27/01/2022
Next Review Date	27/01/2025
NSQC Approval Date	27/01/2022
QP Version	2.0
Model Curriculum Creation Date	27/01/2022
Model Curriculum Valid Up to Date	27/01/2025
Model Curriculum Version	2.0
Minimum Duration of the Course	450 hours
Maximum Duration of the Course	510 hours

Program Overview

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

Training Outcomes

At the end of the program, the learner will be able to:

- Discuss work requirements, related processes, and required equipment for electrical system.
- Demonstrate how to install the electrical systems, sub stations and equipment.
- Display how to operate and maintain the electrical systems, sub stations and equipment.
- Discuss health, safety and environmental guidelines for underground metalliferous mines, coalmines, open cast mines and rare earth (RE) chemical plants.
- Describe the requirements for installation, operation and maintenance of electrical system in underground mines and rare earth chemical plant.

Compulsory Modules

The table lists the modules, their duration and mode of delivery.

NOS and Module Details	Theory Duration (hrs)	Practical Duration (hrs)	On-the-Job Training Duration (Mandatory) (hrs)	On-the-Job Training Duration (Recommended) (hrs)	Total Duration (hrs)
Bridge Module	**10:00**	**00:00**	**00:00**	**-**	**10:00**
Module 1 - Introduction to the sector and the job role of Mine Electrician	10:00	00:00	00:00	-	10:00
MIN/N3101: Identify work requirements, related processes and arrange equipment for electrical system NOS Version No. 1 NSQF Level- 4	**10:00**	**30:00**	**40:00**	**-**	**80:00**
Module 2:Identify work requirements, related processes and arrange equipment for electrical system	10:00	30:00	40:00	-	80:00
MIN/N3102: Install the electrical systems/sub-stations and equipment NOS Version No.1 NSQF Level- 4	**20:00**	**50:00**	**50:00**	**-**	**120:00**
Module 3: Install the electrical systems/sub-stations and equipment	20:00	50:00	50:00	-	120:00
MIN/N3103: Operate and maintain electrical systems / substation and equipment NOS Version No.1 NSQF Level- 4	**30:00**	**50:00**	**40:00**	**-**	**120:00**

Module 4: Operate and Maintain electrical systems/substation and equipment	30:00	50:00	40:00	-	120:00
DGT/VSQ/N0102: Employability Skills (60 Hours) NOS Version No. 1 NSQF Level- 4	**24:00**	**36:00**	**00:00**	**-**	**60:00**
Introduction to Employability Skills	00:30	01:00	00:00	-	01:30
Constitutional values - Citizenship	00:30	01:00	00:00	-	01:30
Becoming a Professional in the 21st Century	01:00	01:30	00:00	-	02:30
Basic English Skills	04:00	06:00	00:00	-	10:00
Career Development & Goal Setting	01:00	01:00	00:00	-	02:00
Communication Skills	02:00	03:00	00:00	-	05:00
Diversity & Inclusion	01:00	01:30	00:00	-	02:30
Financial and Legal Literacy	02:00	03:00	00:00	-	05:00
Essential Digital Skills	04:00	06:00	00:00	-	10:00
Entrepreneurship	03:00	04:00	00:00	-	07:00
Customer Service	02:00	03:00	00:00	-	05:00
Getting Ready for Apprenticeship & Jobs	03:00	05:00	00:00	-	08:00
Total Duration	**94:00**	**166:00**	**130:00**	**-**	**390:00**

Elective Modules- (mandatory to select at least one)

The table lists the elective modules, their duration and mode of delivery.

Elective 1: Underground Metal

NOS and Module Details	Theory Duration (hrs)	Practical Duration (hrs)	On-the-Job Training Duration (Mandatory) (hrs)	On-the-Job Training Duration (Recommended) (hrs)	Total Duration (hrs)
MIN/N1702: Follow Health, Safety and Environmental guidelines for Underground Metalliferous Mines (UMM) (Including Mine Vocational Training Rule and Mine Rescue Rule) NOS Version No. 1 NSQF Level-4	**20:00**	**20:00**	**20:00**	**-**	**60:00**

Module 5: Follow Health, Safety and Environmental Guidelines for Underground Metalliferous Mines(UMM)	20:00	20:00	20:00	-	60:00
Total Duration	**20:00**	**20:00**	**20:00**	**-**	**60:00**

Elective 2: Opencast

NOS and Module Details	Theory Duration (hrs)	Practical Duration (hrs)	On-the-Job Training Duration (Mandatory) (hrs)	On-the-Job Training Duration (Recommended) (hrs)	Total Duration (hrs)
MIN/N1703: Follow Health, Safety, and Environmental Guidelines for opencast mines (Including Mine Vocational Training Rule) NOS Version No. 1 NSQF Level-4	**20:00**	**20:00**	**20:00**	**-**	**60:00**
Module 6: Follow Health, Safety and Environmental Guidelines for Opencast Mines	20:00	20:00	20:00	-	60:00
Total Duration	**20:00**	**20:00**	**20:00**	**-**	**60:00**

Elective 3: Underground Coal

NOS and Module Details	Theory Duration (hrs)	Practical Duration (hrs)	On-the-Job Training Duration (Mandatory) (hrs)	On-the-Job Training Duration (Recommended) (hrs)	Total Duration (hrs)
MIN/N1704: Follow Health, Safety, and Environmental guidelines for underground coal mines (Including Mine Vocational Training Rule and Mine Rescue Rule) NOS Version No. 1 NSQF Level-4	**20:00**	**20:00**	**20:00**	**-**	**60:00**
Module 7: Follow Health, Safety and Environmental Guidelines for Underground Coal Mines	20:00	20:00	20:00	-	60:00
Total Duration	**20:00**	**20:00**	**20:00**	**-**	**60:00**

Elective 4: Rare Earth Plant

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
MIN/N1705: Follow Health, Safety and Environmental guidelines for Rare Earth (RE) Chemical plant NOS Version No. 1 NSQF Level-4	**20:00**	**20:00**	**20:00**	**-**	**60:00**
Module 8: Follow Health, Safety and Environmental Guidelines for Rare Earth (RE) Chemical Plant	20:00	20:00	20:00	-	60:00
Total Duration	**20:00**	**20:00**	**20:00**	**-**	**60:00**

Optional Modules

The table lists the optional modules, their duration and mode of delivery.

Option 1: Underground Installation

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
MIN/N3104: Comply with unique requirements for installation and operations and maintenance (O&M) of electrical system in U/G Mines NOS Version No. 1 NSQF Level-4	**20:00**	**20:00**	**20:00**	**-**	**60:00**
Module 9: Unique requirements for installation and operations and maintenance (O&M) of electrical system in Underground (U/G) Mines	20:00	20:00	20:00	-	60:00
Total Duration	**20:00**	**20:00**	**20:00**	**-**	**60:00**

Option 2: Rare Earth Installation

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
MIN/N3105: Comply with unique requirements for Installation and O&M in Rare Earth Chemical Plant NOS Version No.1 NSQF Level-4	**20:00**	**20:00**	**20:00**	**-**	**60:00**
Module 10: Unique requirements for Installation and O&M in Rare Earth Chemical Plant	20:00	20:00	20:00	-	60:00
Total Duration	**20:00**	**20:00**	**20:00**	**-**	**60:00**

Module Details

Module 1: Introduction to the sector and the job role of Mine Electrician

Bridge Module

Terminal Outcomes:

- Discuss the scope of mining industry.
- Explain the role and responsibility of the Mine Electrician.

Duration:*10:00*	**Duration**:*00:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the importance of the mining industry. • Discuss the provision of wages, working hours, leave, and accident compensation as per the Mines Act-1952. • Explain the different types of mines such as open cast mines, underground mines, etc. • List basic terminologies and machineries used in Opencast Mines, underground mines, etc. • Describe the working cycle of opencast mines, underground mines, etc. • List the role and responsibilities of the Mine electrician. • Explain various types of risks involved in Underground Mines, Open cast mines, Rare Earth Chemical Plants.	
Classroom Aids	
LCD Projector, Laptop/Computer with internet, White Board, Flip Chart, Markers	
Tools, Equipment and Other Requirements	
Posters for describing different types of mines.	

Module 2: Identify work requirements, related processes and arrange equipment for electrical system

Mapped to MIN/N3101, v1.0

Terminal Outcomes:

- Recall the work and process requirements
- Discuss how to arrange electrical equipment, machinery and materials to conduct the processes.

Duration:*10:00*	**Duration**:*30:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss risks and impact of not following procedures/work instructions. • Discuss all the work instructions/ work orders/ work related documents given by the supervisor to understand the requirements for electrical substations/ electrical equipment/electrical wiring or fixture. • Discuss the impact of damaged equipment on the company. • Discuss about the required work output with the supervisor. • Discuss the results/implications of delays in process. • Explain the different types of mines and detail of the mine. • Cite the safety requirement for mines as per CEA regulation 2010. • Discuss how to arrange the resources as per the specifications in the work instructions for installation of electrical substations / equipment/ wiring or fixtures. • Throw light on how to arrange various tools, equipment, measuring apparatus required to perform the job. • Elucidate the code of practice in specific areas of the mine. • Discuss about shot-firing/blasting related safety regulations including taking shelter during blasting. • Throw light on the duties of work men, the provision of compensation and working hours, leaves, etc.as per Mines Act-1952. • Discuss the specifications of various systems within electrical substations/ transmission of electricity/operation of	• Demonstrate how to use various type of fire protection system. • Read the schematic line diagram of substation and associated installations. • Show how to prepare/follow sketches/blueprints to determine the locations of wiring or equipment ensuring conformance to the safety codes. • Demonstrate how to check if the required electrical equipment are in proper working condition. • Show how to check test equipment (Volt-Ohm Meter) on a known live source of same rating to ensure it works properly. • Read various electrical layout and discuss the same with the supervisor.

electrical equipment/ electrical wiring or fixtures as mentioned in the work instructions/ SOP/ Control Diagrams. • Highlight the outcome of violation of safety procedures. • Enlist different types of electrical systems and their specifications; electrical requirements in the mine. • Discuss processes like procurement, store management, inventory management, and quality management. • State key contact points for query resolution. • Summarize different units of measurement related to electricity. • Discuss about various symbols for electrical drawings and circuit diagrams for the electrical systems/equipment for installation/maintenance. • Enlist the different types of tools and tackles used in electrical job. • List different types of measuring instruments. • Discuss the statutory provisions under relevant electrical laws and rules prescribed by relevant authority. • Outline the hazards and safety aspects involved in electrical job and importance of relevant PPEs. • Illustrate the basic working principle of equipment like transformers, switchgears, relays etc. • Discuss the importance of Indian Electricity Rules framework.	

Classroom Aids

LCD Projector, Laptop/Computer with internet, White Board, Flip Chart, Markers, Trainer Chair & Table, Demonstration Table, Pin Up Boards

Tools, Equipment and Other Requirements

Helmet; Dust Mask; Goggles; Ear Plug; Gloves; Reflective Jacket; Safety Belt; Gum Boots; Fire Extinguisher Cylinders; First Aid Box; Fire Fighting Charts; First Aid Charts;Electrical Layouts; Schematic line diagram of substation and associated installations;Connection Bushing Terminal, Bus Bar, MCCB, China Clay Oil Filled Insulator, Board Switch, Power Supply Monitor Panel Board, Megger, Soldering Iron and Consumables, Clamp Meter, Digital Multi Meter, Switchgear, Screw Driver Set, Neo Tester, Combination Pliers , Nose Pliers , Spanner Set , Adjustable Wrench , Pipe Wrench , Measuring Tape , Hack Saw , Hammer , Chisel , Files Set, Wood Saw , Portable Drill Machin, Bench-Vice & Line-Vice , Modal of sub-station for illustration purpose, Single phase transformer 2 KVA, 3 phase transformer oil filled 10 KVA, 3 phase squirrel cage Induction motors 5HP, Generators, Diesel Generator, circuit breakers, isolators, motors, fans, lighting fixtures, ACs, heaters, compressors, pumps, Modal of continuity of circuits, heavy duty cutter, electric knife, connector , Lug, wire gauge, battery charger, blow lamp, pulley puller, Hydrometer, tong tester,

Cable, Cable tray, line tester, lead acid Batteries, Gate end box with female socket: single font, single door and stand mounted with bottom cable entry system, No/Nc push buttons, Electric Grinder; Switch gears; relays, etc.; Insulating and shielding materials; Logic controls such as PLC, RLC, ECM etc.; Company's Safety Management Plan (SMP) and Emergency Management Plan (EMP)

Module 3: Install the electrical systems/sub-stations and equipment

Mapped to MIN/N3102, v1.0

Terminal Outcomes:

- Demonstrate how to install the electrical supply system and equipment

Duration:*20:00*	**Duration**:*50:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss the risk and impact of not following defined procedures/work instructions. • Discuss the importance of following the hierarchy for reporting identified problems. • Discuss the impact of damaged equipment on the company. • Explain the procedure of obtaining work permit from competent person. • Discuss the results/implications of delays in process. • Recall the safety guidelines specified by Directorate General of Mines Safety (DGMS) specific to electricity related operations. • Explain about benching in quarries, dressing of overhangs, undercuts, fencing. • State the importance of safety in the vicinity of machinery. • Summarize the technical concepts of different types of circuit breakers and switchgears and their controls. • Explain the technical concepts of various sensors, special wiring requirements, relays and single phase preventers, step down system 550/110/9V (Volt) intrinsically safe low voltage equipment, etc. • State the importance of following manufacturer recommendations for troubleshooting and maintenance. • Discuss the process of checking the equipment to ensure that it is flameproof. • Discuss the importance of identifying the criticality of installation operation. • Discuss the process of laying cables, cable jointing, vulcanizing of trailing cable. • Recall the allowed voltage restrictions for hand-held portable apparatus.	• Demonstrate how to use various types of electrical tools and measuring instruments for installation of various electrical system and equipment. • Show how to install the required electrical supply systems including transformers, generators, circuit breakers, isolators, bus bars, etc., as per required specified voltage, current, power, energy, frequency, RPM, etc. by using measuring instruments. • Demonstrate how to install electrical equipment like motors, fans, lighting fixtures, ACs, heaters, compressors, pumps etc. • Read the electrical layout and the plan showing the position of all fixed apparatus and conductors therein (provisions of Indian Electricity Act, Mines Act, and other regulations). • Read the sketches and engineering drawings for the electrical systems installation. • Perform the steps to conduct a test to ensure the performance of installed electrical equipment as per the defined specifications. • Show how to make modifications in the parameters if required and ensure alignment with the prescribed standards. • Demonstrate how to examine if conductors have adequate current carrying capacity and joints in conductors are properly soldered. • Show how to check electrical insulation and protection of all live parts. • Apply appropriate techniques how to use special precautionary techniques, personal protective equipment (PPE), insulating and shielding materials and tools while working with energized parts. • Demonstrate how to check that hand cords and receptacles are dry when plugging and unplugging power cables.

• Discuss about maximum stresses, the factors of safety and connection with earth-as per the Indian Electricity Rules (IER). • Highlight the importance of the provision made for immediate and automatic discharge of every static condenser on disconnection of supply. • Throw light on the provisions applicable for medium, high or extra-high voltage installations as per section 51 of IER. • List the different types of electrical tools and machinery. • Outline the hazards and safety aspects involved and importance of relevant PPEs. • Discuss about the electrical defects and how they are generated and can be prevented. • State the significance of the clearance required between equipment as per CEA (Central Electricity Authority) Regulations 2010. • Explain the earthing system for underground mines.	
Classroom Aids	
LCD Projector, Laptop/Computer with internet, White Board, Flip Chart, Markers, Trainer Chair & Table, Demonstration Table, Pin Up Boards	
Tools, Equipment and Other Requirements	
Helmet; Dust Mask; Goggles; Ear Plug; Gloves; Reflective Jacket; Safety Belt; Gum Boots; Fire Extinguisher Cylinders; First Aid Box; Fire Fighting Charts; First Aid Charts; Electrical Layouts; Schematic line diagram of substation and associated installations;Connection Bushing Terminal, Bus Bar, MCCB, China Clay Oil Filled Insulator, Board Switch, Power Supply Monitor Panel Board, Megger, Soldering Iron and Consumables, Clamp Meter, Digital Multi Meter, Switchgear, Screw Driver Set, Neo Tester, Combination Pliers , Nose Pliers , Spanner Set , Adjustable Wrench , Pipe Wrench , Measuring Tape , Hack Saw , Hammer , Chisel , Files Set, Wood Saw , Portable Drill Machin, Bench-Vice & Line-Vice , Modal of sub-station for illustration purpose, Single phase transformer 2 KVA, 3 phase transformer oil filled 10 KVA, 3 phase squirrel cage Induction motors 5HP, Generators, Diesel Generator, circuit breakers, isolators, motors, fans, lighting fixtures, ACs, heaters, compressors, pumps, Modal of continuity of circuits, heavy duty cutter, electric knife, connector , Lug, wire gauge, battery charger, blow lamp, pulley puller, Hydrometer, tong tester, Cable, Cable tray, line tester, lead acid Batteries, Gate end box with female socket: single font, single door and stand mounted with bottom cable entry system, No/Nc push buttons, Electric Grinder; Switch gears; relays, etc.; Insulating and shielding materials; Logic controls such as PLC, RLC, ECM etc.; Company's Safety Management Plan (SMP) and Emergency Management Plan (EMP)	

Module 4: Operate and Maintain electrical systems/substation and equipment

Mapped to MIN/N3103, v1.0

Terminal Outcomes:

- Show how to perform electrical operations
- Demonstrate maintenance procedures

Duration:*30:00*	**Duration**:*50:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss the job-specific documents and importance of the same. • Elucidate the risk and impact of not following defined procedures/work instructions. • Discuss the importance of following the hierarchy for reporting identified problems. • Discuss how to maintain the records of electrical job as per the statutory requirements. • Discuss the impact of damaged equipment on the company. • Throw light on the results/implications of delays in the process. • Explain the procedures to discharge electrical circuit before repair and maintenance. • Discuss the importance of following the maintenance. • Recall the safety guidelines specified by Directorate General of Mines Safety (DGMS) specific to electricity relevant operations. • Summarize the basic principles of electrical energy, and O&M of electrical systems. • Enlist the different types of tools and electrical equipment. • Discuss the electrical hazards and the safety precautions to overcome it. • Outline the statutory requirements for respective electrical systems. • Discuss the causes and prevention of electrical defects/malfunctions. • Illustrate the workings of electrical systems and machines. • Discuss about Diesel Generator (DG), mobile lighting equipment, high mast etc.	• Demonstrate how to ensure the electrical circuit is locked, and tagged properly. • Show how to operate various electrical equipment such as motor, pump, fan etc. • Display how to run the installed electrical equipment in the substation to generate and distribute the electricity to the entire mine area with back-ups and redundancies. • Demonstrate how to repair and maintain the different electrical equipment as per manufacturer's guidelines/SOPs and statutory requirements. • Perform the steps to carry out preventive and break down maintenance for generators, transformers, circuit breakers, isolators, bus bars, control panels, switchboards, wiring, protective relays etc. • Apply appropriate techniques to inspect electrical equipment to identify electrical risks, hazards, defects or the need for adjustment /repair. • Demonstrate the installation and handling procedures of safety devices.

• State the use of PLC, RLC, ECM etc. (Logic controls). • Explain the process of illumination survey and its standards. • Discuss about the electrical defects and how they are generated and can be prevented. • Discuss about interlocking of equipment as per Central Electricity Authority Regulations. • Summarize the importance of sensitization towards different genders and persons with disabilities (PWD).	

Classroom Aids

LCD Projector, Laptop/Computer with internet, White Board, Flip Chart, Markers, Trainer Chair & Table, Demonstration Table, Pin Up Boards

Tools, Equipment and Other Requirements

Helmet; Dust Mask; Goggles; Ear Plug; Gloves; Reflective Jacket; Safety Belt; Gum Boots; Fire Extinguisher Cylinders; First Aid Box; Fire Fighting Charts; First Aid Charts; Electrical Layouts; Schematic line diagram of substation and associated installations;Connection Bushing Terminal, Bus Bar, MCCB, China Clay Oil Filled Insulator, Board Switch, Power Supply Monitor Panel Board, Megger, Soldering Iron and Consumables, Clamp Meter, Digital Multi Meter, Switchgear, Screw Driver Set, Neo Tester, Combination Pliers , Nose Pliers , Spanner Set , Adjustable Wrench , Pipe Wrench , Measuring Tape , Hack Saw , Hammer , Chisel , Files Set, Wood Saw , Portable Drill Machin, Bench-Vice & Line-Vice , Modal of sub-station for illustration purpose, Single phase transformer 2 KVA, 3 phase transformer oil filled 10 KVA, 3 phase squirrel cage Induction motors 5HP, Generators, Diesel Generator, circuit breakers, isolators, motors, fans, lighting fixtures, ACs, heaters, compressors, pumps, Modal of continuity of circuits, heavy duty cutter, electric knife, connector , Lug, wire gauge, battery charger, blow lamp, pulley puller, Hydrometer, tong tester, Cable, Cable tray, line tester, lead acid Batteries, Gate end box with female socket: single font, single door and stand mounted with bottom cable entry system, No/Nc push buttons, Electric Grinder; Switch gears; relays, etc.; Insulating and shielding materials; Logic controls such as PLC, RLC, ECM etc.; Company's Safety Management Plan (SMP) and Emergency Management Plan (EMP)

Employability Skills (60 Hours)

Mapped to DGT/VSQ/N0102, v1.0

Key Learning Outcomes	
Introduction to Employability Skills	**Duration: 1.5 Hours**
1. Discuss the Employability Skills required for jobs in various industries 2. List different learning and employability related GOI and private portals and their usage	
Constitutional values - Citizenship	**Duration: 1.5 Hours**
3. Explain the constitutional values, including civic rights and duties, citizenship, responsibility towards society and personal values and ethics such as honesty, integrity, caring and respecting others that arerequired to become a responsible citizen 4. Show how to practice different environmentally sustainable practices.	
Becoming a Professional in the 21st Century	**Duration: 2.5 Hours**
5. Discuss importance of relevant 21st century skills. 6. Exhibit 21st century skills like Self-Awareness, Behavior Skills, time management, critical and adaptivethinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn etc. in personal or professional life. 7. Describe the benefits of continuous learning.	
Basic English Skills	**Duration: 10 Hours**
8. Show how to use basic English sentences for everyday conversation in different contexts, in person andover the telephone 9. Read and interpret text written in basic English 10. Write a short note/paragraph / letter/e -mail using basic English	
Career Development & Goal Setting	**Duration: 2 Hours**
11. Create a career development plan with well-defined short- and long-term goals	
Communication Skills	**Duration: 5 Hours**
12. Demonstrate how to communicate effectively using verbal and nonverbal communication etiquette. 13. Explain the importance of active listening for effective communication 14. Discuss the significance of working collaboratively with others in a team	
Diversity & Inclusion	**Duration: 2.5 Hours**
15. Demonstrate how to behave, communicate, and conduct oneself appropriately with all genders and PwD 16. Discuss the significance of escalating sexual harassment issues as per POSH act.	
Financial and Legal Literacy	**Duration:5 Hours**
17. Outline the importance of selecting the right financial institution, product, and service 18. Demonstrate how to carry out offline and online financial transactions, safely and securely 19. List the common components of salary and compute income, expenditure, taxes, investments etc. 20. Discuss the legal rights, laws, and aids	
Essential Digital Skills	**Duration: 10 Hours**
21. Describe the role of digital technology in today's life 22. Demonstrate how to operate digital devices and use the associated applications and features, safely and securely 23. Discuss the significance of displaying responsible online behavior while browsing, using various social media platforms, e-mails, etc., safely and securely 24. Create sample word documents, excel sheets and presentations using basic features 25. utilize virtual collaboration tools to work effectively	
Entrepreneurship	**Duration: 7 Hours**
26. Explain the types of entrepreneurship and enterprises 27. Discuss how to identify opportunities for potential business, sources of funding and associated financial and legal risks with its mitigation plan 28. Describe the 4Ps of Marketing-Product, Price, Place and Promotion and apply them as per requirement	

29. Create a sample business plan, for the selected business opportunity	
Customer Service	**Duration: 5 Hours**
30. Describe the significance of analyzing different types and needs of customers 31. Explain the significance of identifying customer needs and responding to them in a professional manner. 32. Discuss the significance of maintaining hygiene and dressing appropriately	
Getting Ready for apprenticeship & Jobs	**Duration: 8 Hours**
33. Create a professional Curriculum Vitae (CV) 34. Use various offline and online job search sources such as employment exchanges, recruitment agencies, and job portals respectively 35. Discuss the significance of maintaining hygiene and confidence during an interview 36. Perform a mock interview 37. List the steps for searching and registering for apprenticeship opportunities	

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
Graduate/CITS	Any discipline	-	-	2	Teaching experience	Prospective ES trainer should: • have good communication skills • be well versed in English • have digital skills • have attention to detail • be adaptable • have willingness to learn
Current ITI trainers	Employability Skills Training (3 days full-time course done between 2019-2022)	-	-	-	-	
Certified current EEE trainers (155 hours)	from Management SSC (MEPSC)	-	-	-	-	
Certified Trainer	Qualification Pack: Trainer (MEP/Q0102)	-	-	-	-	

Trainer Certification	
Domain Certification	**Platform Certification**
Certified in 60-hour Employability NOS (2022), with a minimum score of **80%** **OR** Certified in 120-, 90-hour Employability NOS (2022), with a minimum score of **80%**	MEP/Q2601, v2.0 Trainer (VET and Skills). Minimum accepted score as per SSC guideline is 80%.

Master Trainer Requirements

Master Trainer Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
Graduate/CITS	Any discipline	-	-	3	Employability Skills curriculum training experience with an interest to train as well as orient other peer trainers	Prospective ES Master trainer should: • have good communication skills • be well versed in English • have basic digital skills • have attention to detail • be adaptable • have willingness to learn • be able to grasp concepts fast and is creative with teaching practices and likes sharing back their learning with others
Certified Master Trainer	Qualification Pack: Master Trainer (MEP/Q2602	-	-	3	EEE training of Management SSC (MEPSC) (155 hours)	

Master Trainer Certification	
Domain Certification	**Platform Certification**
Certified in 60-hour Employability NOS (2022), with a minimum score of **90%.** **OR** Certified in 120-, 90-hour Employability NOS (2022), with a minimum score of **90%**	MEP/Q2602, v2.0 Master Trainer (VET and Skills). Minimum accepted score as per SSC guideline is 90%.

Assessment Strategy

The trainee will be tested for the acquired skill, knowledge and attitude through formative/summative assessment at the end of the course and as this NOS and MC is adopted across sectors and qualifications, the respective AB can conduct the assessments as per their requirements.

LIST OF TOOLS & EQUIPMENT FOR EMPLOYABILITY SKILLS		
S No.	**Name of the Equipment**	**Quantity**
1.	Computer (PC) with latest configurations – and Internet connection with standard operating system and standard word processor and worksheet software (Licensed) (all software should either be latest version or one/two version below)	As required
2.	UPS	As required
3.	Scanner cum Printer	As required
4.	Computer Tables	As required
5.	Computer Chairs	As required
6.	LCD Projector	As required
7.	White Board 1200mm x 900mm	As required
Note: Above Tools &Equipment not required, if Computer LAB is available in the institute.		

Proposed Assessment Strategy/Guidelines:

1. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria mentioned above).

2. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/ training center based on these criteria.

Module 5: Follow Health, Safety and Environmental Guidelines for Underground Metalliferous Mines (UMM)

Mapped to MIN/N1702, v1.0

Terminal Outcomes:

- Discuss worksite health and safety measures, and environmental guidelines.

Duration:*20:00*	**Duration**:*20:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the importance of undertaking "The Take-5 (Personal Risk Assessment)" before commencement of any work (DGMS Tech. circulars 2/2014). • Discuss how to comply with safety, health and security-related regulations/guidelines at the mine. • Recall the safety guidelines specified by Directorate General of Mine Safety (DGMS). • List the precautions to be followed against U/G electrical appliances. • Recall appropriate safety practices while traveling on U/G haul roads, in case of post blast fumes and misfire. • Discuss the manufacturer's instructions for care and safe operation of mine machinery and equipment. • Discuss about various types of gases found in the mine and their effect. • Discuss the laid out procedure to be followed in case of gas detecting alarm signal on leakage of inflammable gases. • Shed light on how to use appropriate PPE as per the requirement. • State how to identify six directional hazards at workplace and take decisions accordingly. • Discuss how to check that roof supporting is as per Systematic Support Plan (SSP) and approved Systematic Support Rules (SSR) while undertaking work in an area. • Elaborate on how to follow appropriate Standard Operating Procedure while working near any isolated and sealed off area of the mine. • List the different types of machineries used in U/G mines.	• Demonstrate how to operate various types of fire extinguishers to control different types of fire at a worksite when required. • Show how to use self-rescue apparatus, appropriately when required. • Read line diagram of ventilation circuit to identify the working ventilation district, to direct air to the working face.

• Throw light on provision of medical examination (IME & PME) of person employed as per Mines Rules 1955. • State the importance of first aid and hygiene. • Explain how to take precaution against occupational health hazards (like dust, water, mine gases etc.) due to U/G working environment. • Discuss duties and rights of workers, as well as the safety and occupational health policy of organization. • Throw light on the selection process of person for rescue training. • Shed light on isolation and sealed off area of the mine. • Discuss the various problems/incidents likely to occur and precautions to be taken when handling heavy equipment. • State the mine safety standard including illumination level, noise levels, dust level, pollutants, etc. at the work-site. • List the common sources of pollution in the mines and ways to minimize it. • Discuss the process to be followed for reporting any unsafe act/condition in work area to the concerned person. • Describe how to use underground mine communication system. • State the importance of maintaining positive isolation at the work site. • Describe the safety appliances and rescue equipment. • State how to report any symptoms of illness to the shift-in-charge. • Outline the role of Internal Safety Organisation, safety committee, workman's inspector and DGMS. • Discuss the mining area-specific signs, and other safety and emergency signals and the outcome of violation of safety procedures. • List the role and responsibilities of rescue room and rescue team. • Discuss how to contact rescue room and rescue team in case of emergency. • State the importance of taking shelter at the miner's station during blasting operation. • Discuss about the safety equipment and importance of FAB (Fresh Air Base).	

• Describe shot-firing / blasting related safety regulations including taking shelter during blasting. • Throw light on the emergency response /disaster management plan prepared by the organization as per DGMS guideline. • Explain the rules and regulations for safety and security while handling hazardous materials. • Outline the basic provisions in Mines Creche Rules, 1966 (MCR) for females employed in the mines. • Discuss the importance of sensitization towards different genders and persons with disabilities (PWD). • Explain the importance of following infection control policies, '5-S' practices, and waste management. • Discuss the importance of water/material/energy conservation and management. • Discuss Safety Management Plan (SMP) and Emergency Management Plan (EMP). • Explain how to maintain hand hygiene by washing hands with alcohol based sanitisers/soap. • Elucidate on how to maintain hygiene at the work site and disinfect the machine/tools before and after work/task. • Discuss the environmental impact of mining related operations and steps to reduce those impacts. • Throw light on the mineral conservation practices in U/G mining operations to achieve optimum ore or mineral recovery. • Explain how to ensure that stowing practices produce minimum disturbance to the surface. • Discuss how to ensure that the subgrade ore is carried out to surface and stacked separately at the earmarked place. • Explain how to ensure the productivity of the machine for material/fuel conservation.	
Classroom Aids	
LCD Projector, Laptop/Computer with internet, White Board, Flip Chart, Markers, Trainer Chair & Table, Demonstration Table, Pin Up Boards	
Tools, Equipment and Other Requirements	

Helmet, gloves, harness, earplugs, Safety Goggles, Nose mask, Safety shoes, Fire extinguisher, Types of log book, First Aid box, MCDR, MCR, Company's SOP; Diagrams showing quarries, overhangs, fencing, etc.; samples of different types of rocks to be encountered; Mines Act; "5-S" Charts; Daily, Weekly, Monthly Maintenance/Defect sheets; Systematic Support Plan (SSP); Systematic Support Rules (SSR); self-rescue apparatus; Line Diagram of Ventilation Circuit; Alcohol based sanitisers; self-rescue apparatus; Gas Detector, Safety Lamp, Self-Contained Breathing Apparatus, gum boots; Diagrams of Armoured face conveyor; Charts of coal mines occupational diseases; CMR; MRR, Company's Safety Management Plan (SMP) and Emergency Management Plan (EMP)

Module 6: Follow Health, Safety and Environmental Guidelines for Opencast Mines

Mapped to MIN/N1703, v1.0

Terminal Outcomes:

- Discuss worksite health and safety measures and environmental guidelines.

Duration: *20:00*	**Duration**:*20:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain how to comply with safety, health, and security-related regulations/guidelines at the open cast mine and safety instructions given by the workman's inspector. • Discuss about various environmental awareness program related to mining, organized by the various government bodies/ company. • Discuss the importance of following adequate safety while working at haul roads, heights, overburden dumps, sump area, stockyard, near moving parts, etc. • Recall the safety precautions to be taken while working on sites (sub-station, workshop etc.), with equipment, and conducting welding and cutting operations. • Discuss how to follow appropriate Safe Operating Procedure (SOP) while dealing with explosives. • Explain the importance of responding promptly and appropriately to an accident/ incident or an emergency situation, within limits of the role and responsibility. • Discuss usage of appropriate PPE as per the requirement. • Explain how to maintain hand hygiene by washing hands with alcohol based sanitisers/soap. • Elucidate on how to maintain hygiene at the work site and disinfect the machine/tools before and after work/task. • State how to report any symptoms of illness to the shift-in-charge. • Discuss the safety guidelines specified by Directorate General of Mine Safety (DGMS).	• Show how to provide first aid to an injured person. • Display how to operate various types of fire extinguishers to control different types of fire at a worksite when required.

• List basic mining terminologies and definitions. • Explain about the means of access and egress from the mines, location of workshop, haul roads and working face including dump yards. • Outline about the shot-firing / blasting related safety regulations including taking shelter during blasting. • Discuss the duties of workers, working hours and accident compensation as per under The Mines act-1952. • Throw light on the hierarchy of the reporting. • Recall the proper documents specific to the machine. • Discuss about the machine operation, condition of the machine and worksite. • Throw light on various problems/ incidents and precautions to be taken when handling heavy equipment. • Throw light on the environmental impact of related opencast mining operations. • Discuss how to follow the process for collecting, storing and disposing of the hazardous material and waste in compliance with worksite guidelines. • Explain the process of top soil removal and management and ensure not to mix topsoil with waste in day to day tasks. • Discuss how to ensure that HEMM is washed at the designated location. • Illuminate on how to ensure the productivity of the machine for material/fuel conservation. • Discuss the mineral conservation practices specified by the organization in accordance with MCDR-2017 (Mineral Conservation and Development Rules). • Discuss how to assist supervisor for reducing environmental impact caused due to related mining operations. • Discuss the role of workmen inspector, safety committee and internal safety organization. • Throw light on the importance of signages, mining area-specific signs, and other safety and emergency signals. • State the outcome of violation of safety procedures.	

• Discuss the importance of sensitization towards different genders and PWD (Persons with Disabilities). • Throw light on mine sump and pumping system of the mines. • State the mine safety standard including illumination level, noise levels, dust level, pollutants, etc. at the work-site. • List the common sources of pollution in the mines and ways to minimize it. • Enlist the safety equipment. • Discuss emergency response /disaster management plan prepared by the organization.	
Classroom Aids	
LCD Projector, Laptop/Computer with internet, White Board, Flip Chart, Markers, Trainer Chair & Table, Demonstration Table, Pin Up Boards	
Tools, Equipment and Other Requirements	
Helmet, gloves, harness, earplugs, Safety Goggles, Nose mask, Safety shoes, Fire extinguisher, Types of log book, First Aid box, MCDR, MCR, Company's SOP; Diagrams showing quarries, overhangs, fencing, etc.; samples of different types of rocks to be encountered; Mines Act; "5-S" Charts; Daily, Weekly, Monthly Maintenance/Defect sheets; Systematic Support Plan (SSP); Systematic Support Rules (SSR); self-rescue apparatus; Line Diagram of Ventilation Circuit; Alcohol based sanitizers; self-rescue apparatus; Gas Detector, Safety Lamp, Self-Contained Breathing Apparatus, gum boots; Diagrams of Armoured face conveyor; Charts of coal mines occupational diseases; CMR; MRR, Company's Safety Management Plan (SMP) and Emergency Management Plan (EMP);	

Module 7: Follow Health, Safety and Environmental Guidelines for Underground Coal Mines

Mapped to MIN/N1704, v1.0

Terminal Outcomes:

- Discuss worksite health and safety measures and environmental guidelines.

Duration:*20:00*	**Duration**:*20:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• List the preventive measures against firedamp, white damp, blackdamp etc. • Explain the importance of undertaking "The Take-5 (Personal Risk Assessment)" before commencement of any work (DGMS Tech. circulars 2/2014). • Discuss how to check that roof supporting is as per Systematic Support Plan (SSP) and approved Systematic Support Rules (SSR while undertaking work in an area. • Throw light on various types of gases available in the mine and their effects; and their control measures. • Discuss how to comply with safety, health and security-related regulations/guidelines at the mine. • Describe how to ensure that oil, grease, canvas or other inflammable material are stored in fire-proof receptacle. • Discuss the importance of ensuring that every instrument, apparatus and equipment are DGMS approved before these are used. • List the safety precautions to be followed against spontaneous heating of the coal. • Discuss how to ensure that no person is traveling/ working/ staying under unsupported roof. • Throw light on how to take precaution against occupational health hazards due to U/G working environment. • Discuss the importance of reporting any symptoms of illness to the shift-incharge. • Discuss Safety Management Plan (SMP) and Emergency Management Plan (EMP) and precautions against U/G electrical appliances. • Discuss the safety guidelines specified by Directorate General of Mine Safety (DGMS)and selection process of person for rescue training.	• Show how to use the flame safety lamp for detecting the methane gas as per Standard Operating Procedure (SOP). • Demonstrate how to operate various types of fire extinguishers to control different types of fire at worksite, if required. • Display how to use self-rescue apparatus appropriately when required. • Read the line diagram of ventilation circuit to identify the working ventilation district to direct air to the working face. • Demonstrate how to keep Armoured face conveyor (AFC) and chocks in straight line for every cycle of operations and tightened up to the setting pressure while keeping it in full contact with the roof, applicable for longwall mining. • Show how to provide first aid to an injured person.

• Elucidate on how to take proper care against damage and accidents while loading, transporting, dismantling and erecting of roof supports. • Throw light on how to follow appropriate SOP while working near any isolated and sealed off area of the mine. • Discuss the provision of medical examination (Initial Medical Examination (IME) & Periodical Medical Examination (PME)) of a person employed, as per Mines Rules 1955. • List different types of machineries used in U/G mines. • Enlist different types of supporting system used in U/G mines as per SSP and SSR. • Cite precautions to be taken when handling heavy equipment. • Discuss how to ensure that the roof and sidewalls of the mine face (or newly exposed area of the mines) have been scaled/ dressed properly. • List relevant safety precautions to be taken during depillaring operation in UCM. • Recall the safety precautions to be followed while traveling on U/G haul roads, in case of post blast fumes and misfire. • Discuss the manufacturer's instructions for care and safe operation of mine machinery and equipment. • Throw light on the laid out SOP in case of alarm signal for leakage of inflammable gases. • Explain the process of reporting any unsafe act/condition in the working area to the concerned person. • Discuss how to use underground mine communication system. • Elucidate the importance of positive isolation near the work. • Discuss the importance of using appropriate Personal Protective Equipment (PPE) as per the requirement. • Explain how to maintain hand hygiene by washing hands with alcohol based sanitisers/soap, disinfect the machine/tools before and after work/task and maintain hygiene at the work site.	

• Discuss how to identify six directional hazards at workplace and take decisions accordingly. • Discuss the environmental impact of mining related operations and steps to reduce those impacts. • Throw light on the mineral conservation practices in U/G mining operations to achieve optimum ore or mineral recovery. • Describe how to ensure that the stowing practices produce minimum disturbance to the surface. • Discuss how to ensure that the subgrade coal is carried out to surface and stacked separately at the earmarked place. • Throw light on how to ensure the productivity of the machine for material/fuel conservation. • Outline the process for collecting, storing and disposing of the hazardous material and waste (like used oil, lubricant, battery, etc.) in compliance with worksite guidelines. • Discuss the "5-S" practice at work site. • Discuss the duties and rights of workers. • List the various electrical problems/incidents likely to occur. • Throw light on the role of Internal Safety Organization, safety committee, workman's inspector and DGMS. • State mine safety standard including light illumination level, noise levels, dust level, pollutants, etc. at the work-site. • List common sources of pollution in the mines and ways to minimize it. • Discuss shot-firing / blasting related safety regulations including taking shelter during blasting. • Recall mining area-specific signs, and other safety and emergency signals. • Discuss the outcome of violation of safety procedures. • List safety appliances and rescue equipment. • Discuss the safety and occupational health policy of organisation. • Explain the importance of FAB (Fresh Air Base). • State basic provisions in Mines Creche Rules, 1966 (MCR) for any females employed in the mines.	

• Discuss about basic safety regulations of Coal Mines Regulation,2017 (CMR). • List types of stone dust barrier and its importance. • Explain coal dust explosion and its preventive measures. • Classify coal mines as per the degree of gassiness of coal seams such as first degree, second degree, and third-degree mines. • List the precautions to be taken as per the gassiness of the coal mines. • Discuss about coal mines occupational disease and their preventive measures. • List the roles, duties and responsibilities of rescue team members, rescue room and rescue station. • Discuss how to contact them in case of emergency. • Enlist the correct steps for conducting any rescue work as per Mine Rescue Rule (MRR). • State the importance of sensitization towards different genders and persons with disabilities (PWD). • Discuss the importance of waste management, hazardous material safety, security rules and regulations. • Throw light on importance of water/material/energy conservation and management.	

Classroom Aids

LCD Projector, Laptop/Computer with internet, White Board, Flip Chart, Markers, Trainer Chair & Table, Demonstration Table, Pin Up Boards

Tools, Equipment and Other Requirements

Helmet, gloves, harness, earplugs, Safety Goggles, Node mask, Safety shoes, Fire extinguisher, Types of log book, First Aid box, MCDR, MCR, Company's SOP; Diagrams showing quarries, overhangs, fencing, etc.; samples of different types of rocks to be encountered; Mines Act; "5-S" Charts; Daily, Weekly, Monthly Maintenance/Defect sheets; Systematic Support Plan (SSP); Systematic Support Rules (SSR); self-rescue apparatus; Line Diagram of Ventilation Circuit; Alcohol based sanitisers; self-rescue apparatus; Gas Detector, Safety Lamp, Self-Contained Breathing Apparatus, gum boots; Diagrams of Armoured face conveyor; Charts of coal mines occupational diseases; CMR; MRR, Company's Safety Management Plan (SMP) and Emergency Management Plan (EMP);

Module 8: Follow Health, Safety and Environmental Guidelines for Rare Earth (RE) Chemical Plant

Mapped to MIN/N1705, v1.0

Terminal Outcomes:

- Discuss worksite health and safety measures and environmental guidelines.

Duration:*20:00*	**Duration**:*20:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss occupational health and safety regulations adopted by the employer. • Outline Rare Earth (RE) Chemical Plant safety procedures and the outcome of violation of safety procedures. • Recall safety and occupational health policy of organization. • Discuss how to identify the hazards and risks. • Explain process for reporting any unsafe act/condition in work area. • Enlist the duties and rights of workers. • Describe the provision of wages, working hours and accident compensation as per Atomic Energy Factory Rules. • State the code of practice for safe handling and transport of dangerous material and heavy equipment. • Discuss how to ensure the productivity of the machine for material/fuel conservation. • Recall different types of Rare Earth (RE) Chemical factories. • List various types of chemical processes carried out in the plant. • Discuss about fencing, guarding, spillage control etc. in relation to Rare Earth (RE) Chemical Plant. • List the correct safety steps to be taken in case of accident or major failure. • Enlist safety precautions required while handling cables; working near electrical installations, over headlines and while working with various electrical equipment in the plant.	• Demonstrate how to operate various grades of fire extinguishers. • Demonstrate how to provide first-aid to an injured person. • Demonstrate installation and handling of safety devices. • Demonstrate how to comply with Safety Management Plan (SMP) and Emergency Management Plan (EMP). • Demonstrate how to identify six directional hazards at workplace and take decisions accordingly.

• Discuss the importance of appropriate PPE as per the requirement. • Explain how to maintain hand hygiene by washing hands with alcohol based sanitizers/soap and how to disinfect and maintain hygiene of the site/panel/tools. • Discuss how to identify six directional hazards at workplace and take decisions accordingly. • Describe how to report any symptoms of illness like COVID etc. to the shift-in charge. • Discuss the importance of identifying the environmental impact of operations related to Rare Earth (RE) Chemical plant and how to reduce the impact. • Describe about Internal Safety Organization and role of safety committee, workman's inspector and AERB. • Discuss the process for collecting, storing and disposing of the hazardous material and waste in compliance with worksite guidelines and safety guidelines, as prescribed by regulatory authorities like Atomic Energy Regulatory Board (AERB), United Nations Development Group (UNDG), etc. • Explain the importance of '5-S' practices and waste management. • Discuss the importance of water/material/energy conservation and management.	
Classroom Aids	
LCD Projector, Laptop/Computer with internet, White Board, Flip Chart, Markers, Trainer Chair & Table, Demonstration Table, Pin Up Boards	
Tools, Equipment and Other Requirements	
Helmet, gloves, harness, earplugs, Safety Goggles, Nose mask, Safety shoes, Fire extinguisher, Types of log book, First Aid box, Posters for describing different types of RE Chemical plants, Company's Safety Management Plan (SMP) and Emergency Management Plan (EMP); Alcohol based sanitisers.	

Module 9: Comply with unique requirements for installation and operations and maintenance (O&M) of electrical system in U/G Mines

Mapped to MIN/N3104, v1.0

Terminal Outcomes:

- Discuss how to comply with unique requirements for U/G Mine working

Duration:*20:00*	**Duration**:*20:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Throw light on how to locate the right area for installation of sub-station, equipment in U/G mines ensuring safety and ease of maintenance at the selected area. • Discuss how to prepare the underground electrical plan/layout. • Discuss how to maintain electrical lamp room and ensure that all lamps are cleaned, refitted and refilled in a separate room. • Throw light on job-specific documents and importance of the same. • Cite the risk and impact of not following defined procedures/work instructions. • Discuss how to follow all safety standards relevant to electrical layout, earthing system, voltage limit, armored cables and flexible cables as per electricity rules and DGMS guidelines. • Discuss the impact of damaged equipment on the company. • Discuss the safety guidelines specified by Directorate General of MInes Safety (DGMS) specific to U/G electricity relevant operations. • Elucidate how to extend the relevant electrical cables as per the face development while considering all relevant safety precautions. • Discuss the proper earthing procedures, types of cables used in mines. • Explain the earthing of neutral points. • Discuss the usage of flameproof equipment/enclosures.	• Demonstrate how to conduct earthing for U/G mines considering all safety precautions. • Show how to repair and set earth leakage current and time in earth leakage relay. • Display how to use portable hand-lamps in U/G Mines. • Demonstrate how to conduct installation, O&M of signalling and telecom equipment as per intrinsically safe requirement. • Show how to install various safety equipment used in U/G mines. • Demonstrate how to install electric lighting in gassy mines as per CMR (Coal Mines Regulations). • Show how to isolate transformer and switch gears and other electrical equipment. • Demonstrate how to use circuit for the remote control or electric interlocking of apparatus in the U/G mines. • Apply suitable techniques to ensure electrical circuit is locked, and tagged before any installation and O&M. • Demonstrate how to check safety circuits of mining equipment like drilling machines, locomotives, etc.

• Explain how to ensure proper lighting is available before commencement of any electrical work. • State the permissible voltage level for various applications in the underground as per CEA Regulations 2010. • Discuss how to ensure that all power circuits and electrical equipment is de-energized before work is performed, except for troubleshooting or testing. • Discuss how to remove electrical equipment from service in case any potentially dangerous condition is identified. • Explain how to ensure equipment are flameproof while working in gassy mines. • Outline the implications of delays in the process. • Elucidate the outcome of violation of safety procedures. • Recall the precautions to be taken for the gases that exist in U/G mines. • Explain the setting of earth leakage and overload relays. • Describe about tramways and siding, haulage rooms, winding rooms, boilers, electrical gears, etc. • Discuss the working principle and use of Neutral Grounding Resistors (NGR) in underground mines.	
Classroom Aids	
LCD Projector, Laptop/Computer with internet, White Board, Flip Chart, Markers, Trainer Chair & Table, Demonstration Table, Pin Up Boards	
Tools, Equipment and Other Requirements	
Helmet, gloves, harness, earplugs, Safety Goggles, Nose mask, Safety shoes, Fire extinguisher, Types of log book, First Aid box; Neutral Grounding Resistors (NGR); Different types of cables used in mines; CER 2010;	

Module 10: Comply with unique requirements for Installation and O&M in Rare Earth Chemical Plant

Mapped to MIN/N3105, v1.0

Terminal Outcomes:

- Discuss how to install the electrical supply system and equipment
- Demonstrate operations and maintenance procedures

Duration:*20:00*	**Duration**:*20:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Recall the electrical equipment requirements as per the specifications in the work instructions for installation of electrical substations/ electrical equipment/ electrical wiring or fixtures suitable for chemical plants. • Throw light on how to follow all safety standards relevant to electric layout, earthing system, voltage limit, armored cables and flexible cables as per electricity rules applicable for chemical plants. • Discuss the different types of chemical factories and detail of the plant. • Throw light on the plant organisation, time keeping, need for discipline and punctuality. • Explain the fencing, guarding, spillage control, etc. • Describe the risk and impact of not following defined procedures/daily maintenance checklist. • Recall the types of cables, electrical enclosures, accessories etc used in chemical plants. • Outline the precaution to be taken against corrosive liquids, gases that exist in the chemical plant. • Explain the use of flameproof equipment/enclosures. • List the various types of chemical processes carried out in the plant. • Discuss the general operation of Grinding equipment, Digesters, Precipitation & Crystallization set ups, Filters, Mixer Settlers, associated with the chemical plant.	• Demonstrate how to install the electrical supply systems including transformers, generators, circuit breakers, isolators, bus bars, wiring, fuses, earthing, switchboard, control panels, relays etc., by using measuring instruments as per the required working specifications and standards for chemical plants in terms of voltage, current, power, energy, frequency, RPM, etc. • Display how to install required electrical equipment like motors, fans, lighting, ACs, heaters, compressors, pumps, etc. associated with the chemical plant. • Show how to install and commission required electrical components of equipment like Grinding equipment, Digesters, Precipitation & Crystallization setups, Filters, Mixer Settlers, etc. associated with the chemical plant. • Display how to conduct a test to ensure the performance of installed electrical equipment as per the defined specifications. • Show how to carry out predictive, preventive and break down maintenance for generators, transformers, circuit breakers, isolators, bus bars, control panels, switchboards, wiring, protective relays etc. as per the frequency suitable to the chemical plants. • Apply suitable techniques to inspect and test electrical systems for continuity of circuits for proper functioning in electrical wiring, equipment or fixtures using testing devices, to ensure compatibility and safety of the systems, identify electrical risks, hazards, defects or the need for adjustment or repair, and to ensure compliance with relevant statutes.

• Summarize the Rare Earth (RE) chemical plant safety procedures. • Explain how to maintain the records as required in Rare Earth (RE) chemical plant. • Discuss how to make modifications in the parameters of electrical equipment (by selecting the right program from the machine control system), if required and ensure alignment with the prescribed standards. • Explain how to diagnose malfunctioning systems, apparatus, or components, using test equipment and hand tools to locate the cause of a breakdown and correct the problem. • Discuss processes like procurement, store management, inventory management, quality management, etc. • State key contact points for query resolution. • State quality norms prescribed by the organization. • Discuss the importance of sensitization towards different genders and persons with disabilities (PWD).	• Demonstrate how to operate and maintain the electrical equipment as required in chemical plants.
Classroom Aids	
LCD Projector, Laptop/Computer with internet, White Board, Flip Chart, Markers, Trainer Chair & Table, Demonstration Table, Pin Up Boards	
Tools, Equipment and Other Requirements	
Helmet, gloves, harness, earplugs, Safety Goggles, Nose mask, Safety shoes, Fire extinguisher, Types of log book, First Aid box, Posters for describing different types of RE Chemical plants; Posters of Grinding equipment, Digesters, Precipitation & Crystallization set ups, Filters, Mixer Settlers associated with the chemical plant; Electrical Layouts; Schematic line diagram of substation and associated installations;Connection Bushing Terminal, Bus Bar, MCCB, China Clay Oil Filled Insulator, Board Switch, Power Supply Monitor Panel Board, Megger, Soldering Iron and Consumables, Clamp Meter, Digital Multi Meter, Switchgear, Screw Driver Set, Neo Tester, Combination Pliers , Nose Pliers , Spanner Set , Adjustable Wrench , Pipe Wrench , Measuring Tape , Hack Saw , Hammer , Chisel , Files Set, Wood Saw , Portable Drill Machin, Bench-Vice & Line-Vice , Modal of sub-station for illustration purpose, Single phase transformer 2 KVA, 3 phase transformer oil filled 10 KVA, 3 phase squirrel cage Induction motors 5HP, Generators, Diesel Generator, circuit breakers, isolators, motors, fans, lighting fixtures, ACs, heaters, compressors, pumps, Modal of continuity of circuits, heavy duty cutter, electric knife, connector , Lug, wire gauge, battery charger, blow lamp, pulley puller, Hydrometer, tong tester, Cable, Cable tray, line tester, lead acid Batteries; single font, single door and stand mounted with bottom cable entry system, No/Nc push buttons, Electric Grinder; Switch gears; relays, etc.; Insulating and shielding materials; Logic controls such as PLC, RLC, ECM etc.;	

Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
Class X	NA	6	Relevant experience required in Electrical operations in the field of mining sector.	NA	-	-
OR						
ITI	Electrical Engineering	6	Relevant experience required in Electrical operations in the field of mining sector.	NA	-	-
OR						
Diploma	Electrical Engineering	5	Relevant experience required in Electrical operations in the field of mining sector.	NA	-	-
OR						
B-Tech	Electrical Engineering	4	Relevant experience required in Electrical operations in the field of mining sector.	NA	-	-
OR						
CITS-NCIC	Electrician	1	Relevant experience in mining	NA	-	-

Trainer Certification	
Domain Certification	**Platform Certification**
MIN/Q3101, v2.0 Mine Electrician. Minimum accepted score as per SSC guideline is 80%.	MEP/Q2601, v2.0 Trainer (VET and Skills). Minimum accepted score as per SSC guideline is 80%.

Assessor Requirements

Assessor Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training/Assessment Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
Class X	NA	8	Relevant experience required in Electrical operations in the field of mining sector.	NA	-	-
OR						
ITI	Electrical Engineering	8	Relevant experience required in Electrical operations in the field of mining sector.	NA	-	-
OR						
Diploma	Electrical Engineering	7	Relevant experience required in Electrical operations in the field of mining sector.	NA	-	-
OR						
B-Tech	Electrical Engineering	6	Relevant experience required in Electrical operations in the field of mining sector.	NA	-	-
OR						
CITS-NCIC	Electrician	1	Relevant experience in mining	NA	-	-

Assessor Certification	
Domain Certification	**Platform Certification**
MIN/Q3101, v2.0 Mine Electrician. Minimum accepted score as per SSC guideline is 80%.	MEP/Q2701, v2.0 Assessor (VET and Skills). Minimum accepted score as per SSC guideline is 80%.

Assessment Strategy

Assessment system Overview: -

Assessment will be carried out by SCMS affiliated assessment partners. Based on the results of assessment, SCMS certifies the learners. Candidates have to pass online theoretical assessment which is approved by SCMS.

The assessment will have both theory and practical components in 30:70 ratio.

While theory assessment is summative and an online written exam; practical will involve demonstrations of applications and presentations of procedures and other components. Practical assessment will also be summative in nature.

Testing Environment: -

Training partner has to share the batch start date and end date, number of trainees and the job role.

Assessment is fixed for a day after the end date of training. It could be next day or later. Assessment will be conducted at the training venue.

Question bank of theory and practical will be prepared by assessment agency and approved by SCMS. From this set of questions, assessment agency will prepare the question paper. Theory testing will include multiple choice questions, pictorial question, etc. which will test the trainee on theoretical knowledge of the subject.

The theory and practical assessments will be carried out on same day. If number of candidates are many, more assessors and venue will be organized on same day of the assessment.

Assessment			
Assessment Type	**Formative or Summative**	**Strategies**	**Examples**
Theory	Summative	Written Examination	Knowledge of facts related to the job role and functions. Understanding of principles and concepts related to the job role and functions
Practical	Summative	Structured tasks	Presentation
Viva	Summative	Questioning and Probing	Mock interview on topics

Assessment Quality Assurance framework

Only certified assessor can be assigned for conducting assessment. Provision of 100 % video recording with clear audio to be maintained and the same is to be submitted to SCMS.

The training partner will intimate the time of arrival of the assessor and time of leaving the venue.

Methods of Validation:

Unless the trainee is registered, the person cannot undergo assessment. To further ensure that the person registered is the person appearing for assessment, id verification will be carried out. Aadhar card number is required of registering the candidate for training. This will form the basis of further verification during the assessment. Assessor conducts the assessment in accordance with the assessment guidelines and question bank as per the job role. The assessor carries tablet with the loaded questions. This tablet is geo tagged and so it is monitored to check their arrival and completion of assessment. Video of the practical session is prepared and submitted to SCMS. Random spot checks/audit is conducted by SCMS assigned persons to check the quality of assessment. Assessment agency will be responsible to put details in SIP.

SCMS will also validate the data and result received from the assessment agency.

Method of assessment documentation and access

The assessment agency will upload the result of assessment in the portal. The data will not be accessible for change by the assessment agency after the upload. The assessment data will be validated by SCMS assessment team. After upload, only SCMS can access this data. SCMS approves the results within a week and uploads on SIP.

References

Glossary

Term	Description
Declarative Knowledge	Declarative knowledge refers to facts, concepts and principles that need to be known and/or understood in order to accomplish a task 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 in order 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 psychomotor 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 help 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 Standards
RE	Rare Earths
SIP	Skill India Portal
SOP	Standard Operating Procedure
SCMS	Skill Council for Mining Sector