



Model Curriculum

QP Name: Mine Mechanic/Fitter

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

Options: Rare Earth Installation/ Repair-Underground/ Crusher

QP Code: MIN/Q3203

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



Table of Contents

Training Parameters.....	3
Program Overview	4
Training Outcomes.....	4
Compulsory Modules.....	4
Elective Modules.....	6
Optional Modules	7
Module Details.....	10
Module 1: Introduction to the sector and the job role of Mine Mechanic/Fitter	10
Module 2: Perform installation and preventive maintenance of commonly used mine machineries/equipment.....	11
Module 3: Perform troubleshooting and repair of commonly used mine machineries/equipment...14	
Employability Skills (60 Hours).....	17
Module 4: Follow Health, Safety, and Environmental guidelines for Underground Metalliferous Mines	21
Module 5: Follow Health, Safety and Environmental Guidelines for Opencast Mines.....	24
Module 6: Follow Health, Safety and Environmental Guidelines for Underground Coal Mines	26
Module 7: Follow Health, Safety and Environmental guidelines for Rare Earth (RE) Chemical plant	29
Module 8: Unique requirements for installing, mechanical maintenance, and repair of equipment in Rare Earth (RE) Chemical plant	31
Module 9: Troubleshooting and repair/ maintenance of UG mine equipment/machineries	33
Module 10: Perform repair and maintenance of crusher and it's equipment.....	35
Annexure.....	37
Trainer Requirements	37
Assessor Requirements.....	38
Assessment Strategy.....	39
References	41
Glossary.....	41
Acronyms and Abbreviations	41

Training Parameters

Sector	Mining
Sub-Sector	Engineering Services
Occupation	Mechanical Services
Country	India
NSQF Level	4
Aligned to NCO/ISCO/ISIC Code	NCO-2015/7231.0401
Minimum Educational Qualification and Experience	<p>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 Fitter) of NSQF Level 3.0 with minimum education as 5th Grade pass with 2 years relevant experience</p>
Pre-Requisite License or Training	NA
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:

- Demonstrate how to install and perform preventive maintenance of commonly used mine machineries/equipment
- Show how to troubleshooting and repair of commonly used mine machineries/equipment
- Discuss Health, Safety, and Environmental guidelines for Underground Metalliferous Mines, coal mines, opencast mines and rare earth chemical plant
- Explain the unique requirements for installing, mechanical maintenance, and repair of equipment in Rare Earth (RE) Chemical plant
- Demonstrate how to troubleshoot and repair/maintenance of UG mine equipment/machineries, crusher and it's equipment

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 Mechanic Fitter	10:00	00:00	00:00	-	10:00
MIN/N3211- Perform installation and preventive maintenance of commonly used mine machineries/equipment NOS Version No. 1 NSQF Level-4	20:00	30:00	60:00	-	110:00
Module 2: Perform installation and preventive maintenance of commonly used mine machineries/equipment	20:00	30:00	60:00	-	110:00
MIN/N3212- Perform troubleshooting and repair of commonly used	30:00	90:00	60:00	-	180:00

mine machineries/equipment NOS Version No. 1 NSQF Level-4					
Module 3: Perform troubleshooting and repair of commonly used mine machineries/equipment	30:00	90:00	60:00	-	180:00
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	84:00	156:00	120:00	-	360:00

Elective Modules

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	30:00	30:00	30:00	-	90:00
Module 4: Health, Safety and Environmental Guidelines for Underground Metalliferous Mines	30:00	30:00	30:00	-	90:00
Total Duration	30:00	30:00	30:00	-	90:00

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	30:00	30:00	30:00	-	90:00
Module 5: Health, Safety and Environmental Guidelines for Opencast Mines	30:00	30:00	30:00	-	90:00
Total Duration	30:00	30:00	30:00	-	90:00

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	30:00	30:00	30:00	-	90:00
Module 6: Health, Safety and Environmental Guidelines for Underground Coal Mines	30:00	30:00	30:00	-	90:00
Total Duration	30:00	30:00	30:00	-	90:00

Elective 4: Rare Earth Plant

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/N1705- Follow Health, Safety and Environmental guidelines for Rare Earth (RE) Chemical plant NOS Version No. 1 NSQF Level-4	30:00	30:00	30:00	-	90:00
Module 7: Health, Safety and Environmental Guidelines for Rare Earth(RE) Chemical Plant	30:00	30:00	30:00	-	90:00
Total Duration	30:00	30:00	30:00	-	90:00

Optional Modules

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

Option 1: Rare Earth Installation

NOS and Module Details	Theory Duration (hrs)	Practical Duration (hrs)	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration	Total Duration (hrs)

			(hrs)	(Recommended) (hrs)	
MIN/N3208-Unique requirements for installing, mechanical maintenance, and repair of equipment in Rare Earth (RE) Chemical plant NOS Version No. 1 NSQF Level-4	20:00	20:00	20:00	-	60:00
Module 8: Unique requirements for installing, mechanical maintenance, and repair of equipment in Rare Earth (RE) Chemical plant	20:00	20:00	20:00	-	60:00
Total Duration	20:00	20:00	20:00	-	60:00

Option 2: Repair-Underground

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/N3209- Troubleshooting and repair/ maintenance of UG mine equipment/machineries NOS Version No. 1 NSQF Level-4	20:00	20:00	20:00	-	60:00
Module 9: Troubleshooting and repair/maintenance of UG mine equipment/machineries	20:00	20:00	20:00	-	60:00
Total Duration	20:00	20:00	20:00	-	60:00

Option 3: Crusher

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)
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MIN/N3210- Perform repair and maintenance of crusher and it's equipment NOS Version No. 1 NSQF Level-4	20:00	20:00	20:00	-	60:00
Module 10: Perform repair and maintenance of crusher and it's equipment	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 Mechanic/Fitter

Bridge Module

Terminal Outcomes:

- Discuss the scope of mining industry
- Explain the role and responsibility of the Mechanic Fitter

Duration:10:00	Duration:00:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> ● Describe the concept of Opencast Mining Process. ● Discuss the role and the importance of the Mechanic Fitter. ● Explain various types of risks and hazards involved in Mines. ● Discuss Regulatory context specified to work in Mines. ● Discuss the characteristic features of Metal mines, Coal Mines and rare earth chemical plants. ● Explain provision of wages, working hours and accident compensation. 	
Classroom Aids	
LCD Projector, Laptop/Computer with internet, White Board, Flip Chart, Markers	
Tools, Equipment and Other Requirements	
Posters for describing different types of RE Chemical Plant and associated processes.	

Module 2: Perform installation and preventive maintenance of commonly used mine machineries/equipment

Mapped to MIN/N3211, v1.0

Terminal Outcomes:

- Demonstrate how to install machines, mechanical components and equipment
- Show how to perform preventive maintenance of machine components in plant machinery, pumps, compressors, pneumatic and other machines/vehicles tracking
- Demonstrate how to track and lodge preventive maintenance, repairs, operational faults and other activities

Duration:20:00	Duration:30:00
<p>Theory – Key Learning Outcomes</p> <ul style="list-style-type: none"> ● Discuss the importance of job-specific documents e.g. daily maintenance checklist. ● Explain the risk and impact of not following defined procedures/work instructions. ● Describe the hierarchy for reporting identified problems. ● Elucidate the manufacturer’s instructions for safe handling of the machine/automobile. ● Discuss the impact of damaged equipment on the company. ● Discuss the results/implications of delays in process. ● Describe the handover and takeover procedures of the mine fitter according to company's SOP. ● Illustrate the safety guidelines specified by Directorate General of Mines Safety (DGMS) specific to mechanical operations. ● Explain the maintenance schedule recommended by the equipment manufacturer. ● State the different types of mines and detail of the mine one is working in. ● Cite the importance of benching in quarries, dressing of overhangs, undercuts, fencing. ● Explain how to track hours-in-operation and adhere to preventive maintenance schedules of various machines assigned to them. ● Discuss the importance of first aid and hygiene. ● Explain the code of practice in specific areas of the mine. 	<p>Practical – Key Learning Outcomes</p> <ul style="list-style-type: none"> ● Demonstrate how to use of ropes, slings, towing and lifting devices while assembling/disassembling machine/equipment and safe operation of various types of hand and power tools. ● Read the drawings and blue-prints given in the instruction sheet and installation manual. ● Show how to carry out assembling machines and conveyors, etc. ● Apply appropriate techniques to test assembled machine for proper performance before handing over for operations. ● Show how to carry out greasing and lubrication of pivot points in a machine. ● Demonstrate how to open and re-assemble various types of bearings in machines. ● Show how to adjust valves, linkages, bearings, hydraulic, pneumatic and systems for smooth operation. ● Role-play how to inform the supervisor of problems that are beyond scope.

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|---|---|
| <ul style="list-style-type: none">● Describe how to maintain a checking/maintenance logbook to record all activities performed.● Discuss the standing orders in force at the mine.● Explain the importance of safety in the vicinity of machinery.● Discuss about shot-firing / blasting related safety regulations including taking shelter during blasting.● Illuminate the duties of workmen under the Mines Act-1952.● Discuss the provision of compensation and working hours, leaves, etc. as per Mines Act-1952.● Discuss the outcome of violation of safety procedures.● List different types of machines used in open cast and underground mines and their specific functions.● Illustrate safety management plan prepared by the organization.● List the various types of hand and power tools (spanners, jacks, drills etc.) and their use.● Enlist the various types of lubricants and its importance, storage, handling etc.● List the various types of fasteners, nuts and bolts, threads, seals and couplings.● List the various types of bearings used in machines and their assembly techniques.● Discuss about the air systems, compressors, its uses and pneumatic controls.● List the various types of pumps and control valves of hydraulic systems.● Discuss the construction and operation of crawlers.● Explain the steering systems and various linkages.● Discuss the safety rules while using tools and tackling machine parts.● List the different types of tyres and wheels used in medium and light vehicles, tracks, final drive etc., in case of crawling equipment.● State the hot and cold tyre pressure as per size of tyre and methods of repairs. | <ul style="list-style-type: none">● Demonstrate how to ensure availability of fuel, lubricants, consumables and other supplies. |
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- Explain how the repair of overhauling electrical and mechanical engines takes place; discuss manual and power shift transmissions, hydraulic and pneumatic systems etc.
- Discuss the condition and performance of equipment using condition monitoring tools.
- Explain the Standard Operating Procedure (SOP) for performing preventive maintenance tasks.
- Summarize the importance of sensitization towards different genders and PWD (Persons with Disabilities).

Classroom Aids

LCD Projector, Laptop/Computer with internet, White Board, Flip Chart, Markers

Tools, Equipment and Other Requirements

Multi Meter, Hydrometer, Torque Wrenches ,Engine Assembly (Petrol Or Diesel), Clutch Plate, Gearbox, Rear Axle, Front Axle, Pressure Plate, Cut model of engine assembly, Model of transmission system, Helmet, Dust Mask, Goggles, Ear Plug Gloves, Reflective Jacket, Safety Belt Gum Boots/ Safety shoes, Fire Extinguisher Cylinders, First Aid Box, Fire Fighting Charts, First Aid Charts

Module 3: Perform troubleshooting and repair of commonly used mine machineries/equipment

Mapped to MIN/N3212, v1.0

Terminal Outcomes:

- Demonstrate how to perform troubleshooting and repair/maintenance
- Show how to perform recording and logging

Duration:30:00	Duration:90:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> ● Elucidate how to conduct preventive and repair maintenance of systems; their elements and difference between the two types of maintenance. ● Discuss the importance of job-specific documents e.g. daily maintenance checklist. ● Explain the risk and impact of not following defined procedures/work instructions. ● Describe the hierarchy for reporting identified problems. ● Discuss the impact of damaged equipment on the company. ● Explain the results/implications of delays in the process. ● Discuss handover and takeover procedures of the mine fitter according to company's SOP. ● Summarize the safety guidelines specified by Directorate General of Mines Safety (DGMS) specific to mechanical operations. ● Discuss the safety measures before attempting to carry out any maintenance activity, like positioning the machine on firm and level ground and ensuring it is not running/hot). ● State the different types of mines and detail of the mine one is working in. ● Discuss about benching in quarries, dressing of overhangs, undercuts, fencing. ● Explain how to complete daily/weekly maintenance/defect sheets as provided by the company. ● Discuss the code of practice in specific areas of the mine. ● Illuminate the standing orders in force at the mine. 	<ul style="list-style-type: none"> ● Demonstrate how to use of various measuring instruments and testing tools. ● Show how to compare measured readings with optimal readings to pinpoint faults. ● Demonstrate how to service, diagnose and repair faults in mechanical systems such as gears, steering systems, hydraulic pumps, transmission, crawlers, conveyor belts etc. ● Display how to prevent the front and rear chassis moving and creating a crushing zone (articulated machines only) by ensuring locking bars in position. ● Demonstrate how to adjust valves, belt tensions for optimal operation. ● Show how to test repaired equipment to ensure everything is working correctly and safely (this may include Pre-load testing, parking brake testing, hydraulic pressure, greasing points, air pressure, etc.). ● Role-play the situation on how to inform the supervisor of those problems which are not under one's purview. ● Show how to maintain inventory of fuel, lubricants and order other spares and consumables as required.

- Explain the importance of safety in the vicinity of machinery.
- Discuss about shot-firing / blasting related safety regulations including taking shelter during blasting.
- Discuss the duties of workmen under the Mines Act-1952.
- Throw light on the provision of compensation and working hours, leaves, etc. as per Mines Act-1952.
- Discuss the outcome of violation of safety procedures.
- List different types of machines used in open cast and underground mines and their specific functions.
- Discuss the safety management plan prepared by the organization.
- State the basics of calculations of volume, temperature, pressure, torque, unit conversions.
- List the various types of fasteners, nuts-bolts, threads, seals and couplings.
- Enlist the various types of bearings used in machines and their assembly techniques.
- Discuss about the air systems, compressors, pneumatic controls.
- List the various types of pumps and control valves.
- Discuss the construction and operation of crawlers.
- Explain the steering systems and various linkages.
- Discuss the safety rules while using tools and tackling machine parts.
- Explain how the repair of overhauling electrical and mechanical systems / engines, manual and power shift transmissions.
- Discuss the condition and performance of equipment using condition monitoring tools.
- Discuss the SOP for performing preventive maintenance jobs.
- Summarize the importance of sensitization towards different genders and PWD (Persons with Disabilities).

Classroom Aids

LCD Projector, Laptop/Computer with internet, White Board, Flip Chart, Markers
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Tools, Equipment and Other Requirements
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Multi Meter, Hydrometer, Torque Wrenches ,Engine Assembly (Petrol Or Diesel), Clutch Plate, Gearbox, Rear Axle, Front Axle, Pressure Plate, Cut model of engine assembly, Model of transmission system, Helmet, Dust Mask, Goggles, Ear Plug Gloves, Reflective Jacket, Safety Belt Gum Boots/ Safety shoes, Fire Extinguisher Cylinders, First Aid Box, Fire Fighting Charts, First Aid Charts

Employability Skills (60 Hours)

Mapped to DGT/VSQ/N0102, v1.0

<i>Key Learning Outcomes</i>	
Introduction to Employability Skills	Duration: 1.5 Hours
<ol style="list-style-type: none"> 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
<ol style="list-style-type: none"> 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 are required 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
<ol style="list-style-type: none"> 5. Discuss importance of relevant 21st century skills. 6. Exhibit 21st century skills like Self-Awareness, Behavior Skills, time management, critical and adaptive thinking, 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
<ol style="list-style-type: none"> 8. Show how to use basic English sentences for everyday conversation in different contexts, in person and over 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
<ol style="list-style-type: none"> 11. Create a career development plan with well-defined short- and long-term goals 	
Communication Skills	Duration: 5 Hours
<ol style="list-style-type: none"> 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
<ol style="list-style-type: none"> 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
<ol style="list-style-type: none"> 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
<ol style="list-style-type: none"> 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
<ol style="list-style-type: none"> 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: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • have good communication skills • be well versed in English • have basic digital skills
Certified Master Trainer	Qualification Pack: Master Trainer (MEP/Q2602)	-	-	3	EEE training of Management SSC (MEPSC) (155 hours)	<ul style="list-style-type: none"> • 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

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 4: Health, Safety, and Environmental guidelines for Underground Metalliferous Mines

Mapped to MIN/N1702, v1.0

Terminal Outcomes:

- Demonstrate how to follow worksite health and safety measures
- Show how to follow environmental guidelines

Duration:30:00	Duration:30:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> ● Describe "The Take-5 (Personal Risk Assessment)" training (DGMS Tech. circulars 2/2014) before commencement of any work, comply with safety, health and security-related regulations/guidelines at the mine e.g. follow Standard Operating Procedure (SOP) for material handling in underground (U/G) mine, safety guidelines specified by Directorate General of Mine Safety (DGMS). ● Explain the role of Internal Safety organization, safety committee, workman’s inspector and DGMS, operation of various types of fire extinguishers to control different types of fire at a worksite when required, safety and occupational health policy of organization and six directional hazard identification process. ● State the manufacturer’s instructions for care and safe operation of mine machinery and equipment, the working ventilation district from line diagram of ventilation circuit to direct air to the working face, gas detecting alarm signal on leakage of inflammable gases and laid out procedure to ensure safety. ● Discuss the process for reporting any unsafe act/condition in work area to the concerned person, underground mine communication system, positive isolation near the work place if applicable, safety appliances and rescue equipment. ● Explain the role of workmen inspector and safety committee, rescue room and rescue station and contact them in case of emergency, importance of taking shelter at the miner's station during blasting operation, report any symptoms of illness to the shift-in charge, 	<ul style="list-style-type: none"> ● Demonstrate the use of self-rescue apparatus, appropriately when required, appropriate emergency response procedure during emergency such as fire, water inrush, fall of ground etc., precautions against U/G electrical appliances, various types of gases found in the mine and their effect, self-rescue apparatus and their uses. ● Display appropriate Standard Operating Procedure while working near any isolated and sealed off area of the mine, basic precautionary measures against danger from fire, dust, water and mine gases, safety practices while traveling on U/G haul roads, in case of post blast fumes and misfire, provision of medical examination (IME & PME) of person employed as per Mines Rules 1955, importance of first aid and hygiene. ● Demonstrate that roof supporting is as per Systematic Support Plan (SSP) and approved Systematic Support Rules (SSR) while undertaking work in an area, take precaution against occupational health hazards (like dust, water, mine gases etc.) due to U/G working environment, selection process of person for rescue training, isolation and sealed off area of the mine. ● Conduct role play to show appropriate PPE as per the requirement, maintain hand hygiene by washing hands with

<p>identify six directional hazards at workplace and take decisions accordingly.</p> <ul style="list-style-type: none"> • Explain the usages of safety equipment like safety shoes, safety belt, tight fit clothing, hand gloves, safety goggles, Gas Detector, Safety Lamp, Self-Contained Breathing Apparatus, gum boots, ear plugs, Face Mask, etc., shot-firing / blasting related safety regulations including taking shelter during blasting. • Describe emergency response /disaster management plan prepared by the organization as per DGMS guideline, rules and regulations for safety and security while handling hazardous materials, basic provisions in Mines Creche Rules, 1966 (MCR) for females employed in the mines. 	<p>alcohol based sanitizers/soap, disinfect the machine/tools before and after work/task, maintain hygiene at the work site, basic personal and workplace hygiene, importance of FAB (Fresh Air Base).</p> <ul style="list-style-type: none"> • Demonstrate the precautions to be taken when handling heavy equipment, various problems/incidents likely to occur, mine safety standard including light illumination level, noise levels, dust level, pollutants, etc. at the work-site, common sources of pollution in the mines and ways to minimize it, the environmental impact of mining related operations and follow steps to reduce those impact. • Demonstrate how to follow the mineral conservation practices in U/G mining operations to achieve optimum ore or mineral recovery, stopping practices produce minimum disturbance to the surface, the subgrade ore is carried out to surface and stacked separately at the earmarked place, mining area-specific signs, and other safety and emergency signals, the outcome of violation of safety procedures. • Display how to ensure the productivity of the machine for material/fuel conservation, the process for collecting, storing and disposing of the hazardous material and waste (like used oil, lubricant, battery, etc.) in compliance with worksite guidelines, the "5-S" practice at work site like cleaning oil from ground (to avoid soil from getting damaged), etc.
<p>Classroom Aids</p>	
<p>LCD Projector, Laptop/Computer with internet, White Board, Flip Chart, Markers</p>	
<p>Tools, Equipment and Other Requirements</p>	
<p>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</p>	



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; MMR; MRR, Company's Safety Management Plan (SMP) and Emergency Management Plan (EMP);

Module 5: Health, Safety and Environmental Guidelines for Opencast Mines

Mapped to MIN/N1703, v1.0

Terminal Outcomes:

- Demonstrate how to follow work-site health and safety measures
- Display how to follow environmental guidelines

Duration:30:00	Duration:30:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> ● Discuss safety, health, and security-related regulations/guidelines at the opencast mine, the safety instructions given by the workman's inspector, various environmental awareness program related to mining, organized by the various government bodies/company. ● Explain safety guidelines specified by Directorate General of Mine Safety (DGMS), duties of workers under The Mines act-1952, working hours and accident compensation as per The Mines act-1952. ● Define basic mining terminologies and definitions, hierarchy of the reporting, proper documents specific to the machine. ● Conduct a role play to show the precautions to be taken when handling heavy equipment, various problems/incidents likely to occur, machine operation, condition of the machine and worksite, role of workmen inspector, safety committee and internal safety organization. ● Discuss the environmental impact of related opencast mining operations, the process for collecting, storing and disposing of the hazardous material and waste (like used oil, lubricant, battery, etc.) in compliance with worksite guidelines, ensure not to mix topsoil with waste in day to day tasks. ● Demonstrate that HEMM is washed at the designated location, the productivity of the machine for material/fuel conservation, the mineral conservation practices specified by the organization in accordance with MCDR-2017 (Mineral Conservation and Development Rules), ways to assist supervisor for reducing 	<ul style="list-style-type: none"> ● Demonstrate how to undertake safety precautions while working at haul roads, heights, overburden dumps, sump area, stockyard, near moving parts, etc., while working on sites (sub-station, workshop etc.), with equipment, and conducting welding and cutting operations, means of access and egress from the mines, location of workshop, haul roads and working face including dump yards. ● Practice appropriate Safe Operating Procedure (SOP) while dealing with explosive, accident/ incident or an emergency situation, within limits of the role and responsibility, provide first aid to an injured person, shot-firing / blasting related safety regulations including taking shelter during blasting, emergency response /disaster management plan prepared by the organization. ● Operate various types of fire extinguishers to control different types of fire at a worksite when required, use appropriate PPE as per the requirement, safety equipment like safety shoes, safety belt, tight fit clothing, hand gloves, safety goggles, gas detector, safety lamp, self-contained breathing apparatus, gum boots, ear plugs, face mask, etc. ● Explain the process of top soil removal and management, mine sump and pumping system of the mines, about

<p>environmental impact caused due to related mining operations.</p> <ul style="list-style-type: none"> Exhibit the signages, mining area-specific signs, and other safety and emergency signals, the outcome of violation of safety procedures, basic personal and workplace hygiene. 	<p>mine safety standard including light illumination level, noise levels, dust level, pollutants, etc at the work-site, common sources of pollution in the mines and ways to minimize it</p> <ul style="list-style-type: none"> Conduct a role play to maintain hand hygiene by washing hands with alcohol based sanitisers/soap, disinfect the machine/tools before and after work/task, maintain hygiene at the work site, report any symptoms of illness to the shift-incharge.
<p>Classroom Aids</p>	
<p>LCD Projector, Laptop/Computer with internet, White Board, Flip Chart, Markers</p>	
<p>Tools, Equipment and Other Requirements</p>	
<p>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; MMR; MRR, Company’s Safety Management Plan (SMP) and Emergency Management Plan (EMP);</p>	

Module 6: Health, Safety and Environmental Guidelines for Underground Coal Mines

Mapped to MIN/N1704, v1.0

Terminal Outcomes:

- Demonstrate how to follow worksite health and safety measures
- Show how to follow environmental Guidelines

Duration:30:00	Duration:30:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> ● Discuss about Systematic Support Plan (SSP) and approved Systematic Support Rules (SSR), Isolation and sealed off area of the mine, various types of gases available in the mine and their effects; and their control measures, self-rescue apparatus and their uses, provision of medical examination (IME & PME). ● Explain how to provide first aid to an injured person, safety precautions against spontaneous heating of the coal, various types of fire extinguishers to control different types of fire at worksite, if required, no person should be traveling/working/staying under unsupported roof, roof supporting should be per Systematic Support Plan (SSP) and approved Systematic Support Rules (SSR) while undertaking work in an area. ● Explain the role of workmen inspector and safety committee, mine safety standard including light illumination level, noise levels, dust level, pollutants, etc at the work-site, common sources of pollution in the mines and ways to minimize it, various types of fire extinguishers. ● Demonstrate how to take precaution against occupational health hazards (like dust, water, mine gases etc.) due to U/G working environment, use self-rescue apparatus appropriately when required, emergency response and evacuation plan during emergency such as fire, water inrush, fall of ground etc., precautions against U/G electrical appliances, care against damage and accidents while loading, transporting, dismantling and erecting of roof supports. 	<ul style="list-style-type: none"> ● Take preventive measures against fire damp, white damp, blackdamp etc., the flame safety lamp for detecting the methane gas as per Standard Operating Procedure (SOP), coal dust explosion and importance of stone dust barrier, "The Take-5 (Personal Risk Assessment)" before commencement of any work, safety guidelines specified by Directorate General of Mine Safety (DGMS), selection process of person for rescue training. ● Demonstrate how to undertake safety, health and security-related regulations/guidelines at the mine e.g. SOP for material handling in underground (U/G) mine, follow the safety instructions given by the workman's inspector, safety officer, and other safety concerned authorities, ensure that oil, grease, canvas or other inflammable material are stored in fire-proof receptacle, different types of supporting system used in U/G mines as per SSP and SSR, precautions to be taken when handling heavy equipment. ● Explain the role of Internal Safety Organization, safety committee, workman's inspector and DGMS, every instrument, apparatus and equipment are DGMS approved before these are used, Armoured face conveyor (AFC) and chocks must be kept in straight line for every cycle of operations and tightened up to the setting pressure with keeping

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| <ul style="list-style-type: none"> ● Discuss hazardous material safety, security rules and regulations, safety appliances and rescue equipment, importance and use of various communication system used in UG mines, importance of positive isolation at working site. ● Describe the appropriate Standard Operating Procedure while working near any isolated and sealed off area of the mine, the dressing of the roof and its sides done before enter any newly exposed area of the mines, take relevant safety precautions during depillaring operation in UCM, appropriate safety practices while traveling on U/G haul roads, in case of post blast fumes and misfire. ● Exhibit types of stone dust barrier and its importance, coal dust explosion and its preventive measures, classification of coal mines as per the presence of inflammable gases such as first degree, second degree and third degree mines, precautions as per the gassiness of the coal mines, about coal mines occupational disease such as pneumoconiosis or 'black lung' and its preventive measures. ● Discuss basic provisions in Mines Creche Rules, 1966 (MCR) for any females employed in the mine, basic safety regulations of Coal Mines Regulation, 2017 (CMR), Standard of Ventilation as per the section 153 of the CMR 2017, Standard of Lighting as per the section 178 of the CMR 2017. ● Describe how the subgrade coal is carried out to surface and stacked separately at the earmarked place, the productivity of the machine for material/fuel conservation, the process for collecting, storing and disposing of the hazardous material and waste (like used oil, lubricant, battery, etc.) in compliance with worksite guidelines. | <p>it in full contact with roof, applicable for longwall mining.</p> <ul style="list-style-type: none"> ● Employ safety equipment like safety shoes, safety belt, tight fit clothing, hand gloves, safety goggles, Gas Detector, Safety Lamp, Self-Contained Breathing Apparatus, gum boots, ear plugs, Face Mask, etc., shot-firing / blasting related safety regulations including taking shelter during blasting. ● Apply precaution against occupational health hazards (like dust, water, mine gases etc.) due to U/G working environment, self-rescue apparatus appropriately when required, emergency response and evacuation plan during emergency such as fire, water inrush, fall of ground etc., 5 (Personal Risk Assessment) training (DGMS Tech. circulars 2/2014). ● Evaluate the roles, duties and responsibilities of rescue team members, rescue room and rescue station and how to contact them in case of emergency, the correct steps for conducting any rescue work as per Mine Rescue Rule (MRR), importance of taking shelter at the miner's station during blasting operation. ● Outline the manufacturer's instructions for care and safe operation of mine machinery and equipment, the working ventilation district from line diagram of ventilation circuit to direct air to the working face, gas detecting alarm signal on leakage of inflammable gases and laid out procedure to ensure safety, reporting of any unsafe act/condition in work area to the concerned person. ● Conduct role play on underground mine communication system, positive isolation near the work place if applicable, appropriate usage of PPE as per the requirement, hand hygiene by washing hands with alcohol based |
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	<p>sanitisers/soap, disinfect the machine/tools before and after work/task, hygiene at the work site, report any symptoms of illness to the shift-incharge, six directional hazards at workplace and take decisions accordingly.</p>
<p>Classroom Aids</p>	
<p>LCD Projector, Laptop/Computer with internet, White Board, Flip Chart, Markers</p>	
<p>Tools, Equipment and Other Requirements</p>	
<p>Helmet, gloves, harness, earplugs, Safety Goggles, Noise 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; MMR; MRR, Company's Safety Management Plan (SMP) and Emergency Management Plan (EMP)</p>	

Module 7: Health, Safety and Environmental guidelines for RareEarth (RE) Chemical plant

Mapped to MIN/N1705, 1.0

Terminal Outcomes:

- Demonstrate how to follow worksite health and safety measures
- Display how to follow environmental Guidelines

Duration:30:00	Duration:30:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> ● Describe occupational health and safety regulations adopted by the employer, the correct safety steps in case of accident or major failure. ● Explain the outcome of violation of safety procedures, process for reporting any unsafe act/condition in work area. ● Discuss the hazards and risks and related Emergency Management Plan (EMP) during emergency. ● Demonstrate six directional hazard identification process and Internal Safety Organisation and role of safety committee, workman's inspector and AERB etc. ● Convey any symptoms of illness to the shift-incharge, provision of wages, working hours and accident compensation as per Atomic Energy Factory Rules. ● Evaluate the productivity of the machine for material/fuel conservation, various types of chemical processes carried out in the plant, RE chemical plant safety procedures. 	<ul style="list-style-type: none"> ● Perform operation of various grades of fire extinguishers, general safety precautions while handling cables; electrical installations, overhead lines and while working with various electrical equipment in the plant. ● Conduct installation and handling of safety devices, code of practice for safe handling and transport of dangerous material and heavy equipment. ● Perform first-aid to an injured person, use appropriate PPE as per the requirement, importance of first aid and hygiene. ● Conduct safety and occupational health policy of organization, basic personal and workplace hygiene. ● Perform hand hygiene by washing hands with alcohol based sanitisers /soap, disinfect the site/panel/tools before and after work/task, maintain hygiene at the work site. ● Identify the environmental impact of operations related to RE chemical plant and take steps to reduce the impact, different types of RE chemical factories and detail of the plant one is working in fencing, guarding, spillage control, etc. ● Conduct process for collecting, storing and disposing of the hazardous material and waste (like used oil, lubricant, battery, etc.) in compliance with worksite guidelines and safety guidelines as prescribed by regulatory

	authorities like Atomic Energy Regulatory Board (AERB) etc.
Classroom Aids	
LCD Projector, Laptop/Computer with internet, White Board, Flip Chart, Markers	
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 8: Unique requirements for installing, mechanical maintenance, and repair of equipment in Rare Earth (RE) Chemical plant

Mapped to MIN/N3208, v1.0

Terminal Outcomes:

- Demonstrate how to install the processing and conveying equipment
- Show how to operate and maintenance procedures

Duration:20:00	Duration:20:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> ● Describe different types of chemical factories and detail of the plant. ● Discuss plant organisation, time keeping, need for discipline and punctuality. ● Describe fencing, guarding, spillage control, etc. ● Explain the risk and impact of not following defined procedures/ daily maintenance checklist. ● Discuss how to ensure that no maintenance work is performed on the machine/engine when it is in hazardous condition (e.g. still running, or still hot, or having corrosive chemical spilled over, etc.) ● State the types of anti-corrosive materials and coatings etc. used in processing and conveying equipment enclosures, accessories etc. ● Explain the precaution about corrosive liquids, gases that exist in the RE chemical plant. ● State the use of flameproof equipment/enclosures. ● Discuss the importance of First aid and Hygiene. ● Throw light on the provision of wages, working hours and accident compensation as per Atomic Energy Factory Rule-1996 (AEFR-1996). ● Describe various types of chemical processes carried out in the plant. ● Discuss about the general operation of Grinding equipment, Digesters, Precipitation & Crystallization set ups, Filters, Mixer Settlers, associated with the RE chemical plant. 	<ul style="list-style-type: none"> ● Demonstrate how to install and commission required mechanical components of equipment like grinding equipment, digesters, precipitation and crystallization set ups, filters press, mixer settlers, associated with the chemical plant. ● Show how to carry out various assembly of equipment in chemical plant processing, material handling etc. ● Demonstrate how to service, diagnose and repair faults in mechanical systems such as gears, pumps, agitator’s valves, mixer settlers etc. ● Apply appropriate techniques to ensure proper protective enclosures are provided for rotating parts, drives, belts etc. and that the locking bar is in position to prevent accidental movements and creation of crushing zone. ● Display how to test the equipment after it has been attended for maintenance, to ensure everything is working correctly and safely (this may include load testing, vibration testing etc.) ● Show how to carry out predictive, preventive and break down maintenance for the processing, conveying and other related support equipment such as pumps, valves pipelines etc. as per the frequency suitable to the chemical plants. ● Demonstrate how to diagnose malfunctioning systems, apparatus or components using test equipment and

<ul style="list-style-type: none"> ● Describe the RE chemical plant safety procedures. ● Discuss about the processes like Procurement, Store management, inventory management, quality management and key contact points for query resolution. ● Explain the quality norms prescribed by the organization. ● Discuss how to take precautions to avoid health and safety hazards. 	<p>hand tools to locate the cause of a breakdown - rectify the problem and test the systems for proper functioning.</p> <ul style="list-style-type: none"> ● Show how to operate and maintain the processing and conveying equipment and maintain records as required in RE chemical plants.
<p>Classroom Aids</p>	
<p>LCD Projector, Laptop/Computer with internet, White Board, Flip Chart, Markers</p>	
<p>Tools, Equipment and Other Requirements</p>	
<p>Multi Meter, Hydrometer, Torque Wrenches ,Engine Assembly (Petrol Or Diesel), Clutch Plate, Gearbox, Rear Axle, Front Axle, Pressure Plate, Cut model of engine assembly, Model of transmission system, Helmet, Dust Mask, Goggles, Ear Plug Gloves, Reflective Jacket, Safety Belt Gum Boots/ Safety shoes, Fire Extinguisher Cylinders, First Aid Box, Fire Fighting Charts, First Aid Charts</p>	

Module 9: Troubleshooting and repair/ maintenance of UG mine equipment/machineries

Mapped to MIN/N3209, v1.0

Terminal Outcomes:

- Demonstrate how to perform troubleshooting and repair/ maintenance of UG mine equipment/machineries

Duration:20:00 Theory – Key Learning Outcomes	Duration:20:00 Practical – Key Learning Outcomes
<ul style="list-style-type: none"> ● Discuss the importance of job-specific documents e.g. daily maintenance checklist. ● Explain the risk and impact of not following defined procedures/work instructions. ● Describe the hierarchy for reporting identified problems. ● Discuss the impact of damaged equipment on the company. ● Explain the results/implications of delays in the process. ● Discuss handover and takeover procedures of the mine fitter according to company's SOP. ● Summarize the safety guidelines specified by Directorate General of Mines Safety (DGMS) specific to mechanical operations. ● State different types of mines and detail of the mine one is working in. ● Summarize the importance of first aid and hygiene. ● Explain how to ensure proper working of all safety systems used in the mines. ● Discuss the code of practice in specific areas of the mine. ● Throw light on the standing orders in force at the mine. ● Explain the importance of safety in the vicinity of machinery. ● Discuss about shot-firing/blasting related safety regulations including taking shelter during blasting. ● Discuss about the duties of workmen, provision of compensation and working hours, leaves, etc. under the Mines Act-1952. ● Explain the outcome of the outcome of violation of safety procedures. 	<ul style="list-style-type: none"> ● Demonstrate how to conduct maintenance of the compressor of UG mine equipment, so that it operates properly and generates required output. ● Show how to check and perform basic maintenance and troubleshooting of winding engine drum and its various equipment such as rope joint, slings, cage, skip etc. ● Display how to check and perform maintenance of ventilation fan, booster fan and its various sub-parts. ● Demonstrate how to identify and repair/reduce the air pressure loss in the ventilation system. ● Show how to check and repair any fault in the hoisting or winding system such as head-frame or headgear, rope equipment and their various safety devices. ● Demonstrate how to perform maintenance/repair of the track and mine car if required. ● Apply appropriate techniques to conduct the repairs/install of the various support system used in the mines such as hydraulic power support, rope support, steel props, shield support, rock bolting and its supporting equipment. ● Demonstrate how to perform various repairs of the haulage system such as various rope haulage, rail and track mounted rope haulage and other fittings etc.

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| <ul style="list-style-type: none"> ● Discuss the use of the compressor in mines and its various parameters for required output. ● Discuss about various types of winding engine drum/system and its various equipment such as rope joint, slings, cage, skip etc. ● State the importance of ventilation fan, booster fan and its various sub-parts and its impact by changing various parameters. ● Throw light on the standard mine ventilation parameter as per the DGMS. ● Discuss about various types of the hoisting or winding system such as head-frame or head-gear, rope equipment and their various safety devices and their uses. ● Illustrate the use of various tools for repairing/installing the track and mine car and its applications. ● Enlist various support system used in the mines such as hydraulic power support, rope support, steel props, shield support, rock bolting and its supporting equipment and their importance. ● Enlist various haulage system such as various rope haulage, rail and track mounted rope haulage, and other fittings etc. ● Explain various types of pump used for dewatering and its supporting equipment. | <ul style="list-style-type: none"> ● Show how to repair the various pumps and their supporting equipment/structure. |
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Classroom Aids

LCD Projector, Laptop/Computer with internet, White Board, Flip Chart, Markers

Tools, Equipment and Other Requirements

Multi Meter, Hydrometer, Torque Wrenches, Engine Assembly (Petrol Or Diesel), Clutch Plate, Gearbox, Rear Axle, Front Axle, Pressure Plate, Cut model of engine assembly, Model of transmission system, Helmet, Dust Mask, Goggles, Ear Plug Gloves, Reflective Jacket, Safety Belt Gum Boots/ Safety shoes, Fire Extinguisher Cylinders, First Aid Box, Fire Fighting Charts, First Aid Charts

Module 10: Perform repair and maintenance of crusher and it's equipment

Mapped to MIN/N3210, v1.0

Terminal Outcomes:

- Demonstrate how to perform repair and maintenance of various types of crushers and it's equipment

Duration:20:00	Duration:20:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> ● Discuss the importance of job-specific documents e.g. daily maintenance checklist. ● Explain the risk and impact of not following defined procedures/work instructions. ● Illustrate the important components of a jaw crusher, cone crusher, etc. ● Describe the hierarchy for reporting identified problems. ● Discuss the impact of damaged equipment on the company. ● Explain the results/implications of delays in the process. ● Discuss handover and takeover procedures of the mine fitter according to company's SOP. ● Summarize the safety guidelines specified by Directorate General of Mines Safety (DGMS) specific to mechanical operations. ● State different types of mines and detail of the mine one is working in. ● Summarize the importance of first aid and hygiene. ● Discuss the code of practice in specific areas of the mine. ● Throw light on the standing orders in force at the mine. ● Explain the importance of safety in the vicinity of machinery. ● Discuss about shot-firing/blasting related safety regulations including taking shelter during blasting. ● Discuss about the duties of workmen, provision of compensation and working hours, leaves, etc. under the Mines Act-1952. ● Discuss about different types of crusher, their crushing principle and their importance. 	<ul style="list-style-type: none"> ● Demonstrate how to check different types of crushing principal components such as gates, chutes and gaps, feeder, conveyor, dust collectors, water sprays etc. ● Show how to conduct maintenance of the crushing plant. ● Display how to perform daily checking of plant as per check-list followed by organization. ● Show how to change stoke and re-assembly properly. ● Demonstrate how to check and replace thrust plate of the crusher. ● Apply appropriate techniques to perform replacement of various worn out parts of the crusher, vibrating screen, feeder, conveyor etc. ● Show how to replace main shaft protection sleeve of the crusher. ● Demonstrate how to install upper frame assembly of various crusher. ● Show how to test samples, materials or products to ensure compliance with Indian standard (IS) specifications. ● Display how to conduct operational checks on areas of potential issues like unusual noises/smells, blockages and obstruction, leaks etc. and take corrective actions if required. ● Show how to check indicators that signal need for replacement. ● Demonstrate how to replenish coolants, lubricants, fluids and screeners as and when required.

<ul style="list-style-type: none"> ● Explain how to follow the safe code of practice for erection, installation, operation, repairs, maintenance, dismantling of plant and ancillary equipment. ● Describe different types of crushing principal components, such as gates, chutes and gaps, feeder, conveyor, dust collectors, water sprays etc. ● Discuss about different types of screening equipment like drive mechanism, balance wheel, rocker arms, conveyor belts, guards, etc. ● Through light on the hazards and safety aspects involved in ore processing activities and usage of relevant PPEs. ● Explain various types of feed arrangement of the crusher. 	<ul style="list-style-type: none"> ● Apply appropriate techniques to identify missing or defective components or controls and replace them with genuine OEM recommended components. ● Perform the steps to check oil, fuel tanks for leaks and take necessary actions as per the operational manual. ● Demonstrate how to lubricate all the moving parts at regular intervals.
<p>Classroom Aids</p>	
<p>LCD Projector, Laptop/Computer with internet, White Board, Flip Chart, Markers</p>	
<p>Tools, Equipment and Other Requirements</p>	
<p>Multi Meter, Hydrometer, Torque Wrenches, Engine Assembly (Petrol or Diesel), Clutch Plate, Gearbox, Rear Axle, Front Axle, Pressure Plate, Cut model of engine assembly, Model of transmission system, Helmet, Dust Mask, Goggles, Ear Plug Gloves, Reflective Jacket, Safety Belt Gum Boots/ Safety shoes, Fire Extinguisher Cylinders, First Aid Box, Fire Fighting Charts, First Aid Charts</p>	

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 as Mine Mechanic/Fitter in the field of mining sector.	NA	-	-
OR						
ITI	Mechanical Engineering	6	Relevant experience required as Mine Mechanic/Fitter in the field of mining sector.	NA	-	-
OR						
Diploma	Mechanical Engineering	5	Relevant experience required as Mine Mechanic/Fitter in the field of mining sector.	NA	-	-
OR						
B-Tech	Mechanical Engineering	4	Relevant experience required as Mine Mechanic/Fitter in the field of mining sector.	NA	-	-
OR						
CITS-NCIC	Fitter	1	Relevant experience in mining	NA	-	-

Trainer Certification	
Domain Certification	Platform Certification
MIN/Q3203, V2.0 Mine Mechanic/Fitter. 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 as Mine Mechanic/Fitter in the field of mining sector.	NA	-	-
OR						
ITI	Mechanical Engineering	8	Relevant experience required as Mine Mechanic/Fitter in the field of mining sector.	NA	-	-
OR						
Diploma	Mechanical Engineering	7	Relevant experience required as Mine Mechanic/Fitter in the field of mining sector.	NA	-	-
OR						
B.Tech.	Mechanical Engineering	6	Relevant experience required as Mine Mechanic/Fitter in the field of mining sector.	NA	-	-
OR						
CITS-NCIC	Fitter	1	Relevant experience in mining	NA	-	-

Assessor Certification	
Domain Certification	Platform Certification
MIN/Q3203, V2.0 Mine Mechanic/Fitter. 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 geotagged 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