Model Curriculum

QP Name: Winding Operator
Electives: Underground Metal/ Underground Coal

QP Code: MIN/Q1503

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	Mining Operation
Occupation	Loading and Hauling - Underground
Country	India
NSQF Level	4
Aligned to NCO/ISCO/ISIC Code	NCO-2015/8343.1400
Minimum Educational Qualification and Experience	Class 12th (or its equivalent) with 2 years relevant experience as Certificate-NSQF (Level 3: Jr. Winding Operator)
Pre-Requisite License or Training	NA
Minimum Job Entry Age	20 Years
Last Reviewed on	30/06/2022
Next Review Date	29/06/2025
NSQC Approval Date	30/06/2022
QP Version	2.0
Model Curriculum Creation Date	30/06/2022
Model Curriculum Valid Up to Date	29/06/2025
Model Curriculum Version	2.0
Minimum Duration of the Course	540 hours
Maximum Duration of the Course	540 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 prepare winding engine for operation
- Show how to perform operation of winding engine
- Demonstrate how to perform basic maintenance and troubleshooting of winding engine
- Discuss health, safety and environmental guidelines for underground metalliferous and coal mines.

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**
Introduction to the Job role of Winding Operator	10:00	00:00	00:00		10:00
MIN/N1506: Prepare winding engine for operation *NOS Version No. 1.0* NSQF Level - 4	**20:00**	**40:00**	**50:00**		**110:00**
Prepare winding engine for operation	20:00	40:00	50:00		110:00
MIN/N1507: Perform operations of Winding Engine *NOS Version No. 1.0* NSQF Level - 4	**60:00**	**50:00**	**40:00**		**150:00**
Perform operations of Winding Engine	60:00	50:00	40:00		150:00
MIN/N1508: Perform basic maintenance and troubleshooting of Winding Engine *NOS Version No. 1.0* NSQF Level - 4	**20:00**	**50:00**	**50:00**		**120:00**
Perform basic maintenance and troubleshooting of Winding Engine	20:00	50:00	50:00		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	**134:00**	**176:00**	**140:00**		**450:00**

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. 1.0* NSQF Level- 4	**10:00**	**40:00**	**40:00**		**90:00**
Follow Health, Safety and Environmental Guidelines for Underground Metalliferous Mines	10:00	40:00	40:00		90:00
Total Duration	**10:00**	**40:00**	**40:00**		**90:00**

Elective 2: 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. 1.0* NSQF Level- 4	**10:00**	**40:00**	**40:00**		**90:00**
Follow Health, Safety, and Environmental guidelines for underground coal mines	10:00	40:00	40:00		90:00
Total Duration	**10:00**	**40:00**	**40:00**		**90:00**

Module Details

Module 1: Introduction to the Job Role of Winding Operator

Bridge Module

Terminal Outcomes:

- Discuss the scope of Mining Industry
- Explain the role and responsibility of the Winding Operator (Winding Engine Driver/Operator)

***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. • Explain basic terminologies and machineries used in Opencast Mines, underground mines, etc. • Describe the working cycle of opencast mines, underground mines, etc. • List roles and responsibilities of Winding Engine Driver.	
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: Prepare winding engine for operation

Mapped to MIN/N1506, v1.0

Terminal Outcomes:

- Demonstrate how to conduct pre-operation checks, oiling and cleaning

Duration: *20:00*	***Duration:*** *40:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• State the prescribed code of signals. • Recall that the engine shall be fitted in every shaft with an automatically recording speed indicator. • State the importance of restricting any other person apart from winding engine operator to operate winding engine. • Discuss about the different types of mines and detail of the mine he/she is working in. • Throw light on the mine organisation, timekeeping, need for discipline and punctuality. • Discuss the standing orders in force at the mine and safety measures in the vicinity of machinery. • Discuss the duties of workmen, provision of wages, working hours and accident compensation as per the mines act. • Elucidate how to maintain the winding engine report book to record all activities performed on the winding engine at the end of the shift. • Throw light on mining safety procedures and the impact of violation of safety procedures. • Describe the different types of winding systems (e.g. steam winder, compressed air winder, electrical winders). • Explain the hazard related to different types of winding mechanisms. • Discuss about the control systems/devices and associated safety measures/devices of the respective type of winding system. • State the function of different types of levers and brake/clutch mechanisms. • Recall the code of signal as specified in relevant statutes, organizational processes and guidelines and related	• Display how to examine the engine, brakes, and all appliances to ensure that these are in good working order. • Demonstrate how to check the oil and liquid levels in the hydraulic system, transfer gearboxes, and any other associated system. • Show how to check that the brake is in proper condition to hold the load suspended from the drum. • Display how to check the control and safety devices such as winder brakes, emergency brakes, emergency stop switches, etc. • Demonstrate how to check the controlling system of the winding engine such as operating levers, locking devices, and other associated systems (e.g. foot brake, hand brake, hoisting/un-hoisting lever, etc.) • Show how to check the drum for proper laying of winding rope on the drum pitch. • Role Play the situation on how to report immediately in writing to the engineer or other competent person appointed for any defect which a person has noticed in the engine, brake, indicator, drum, rope, or other appliances undercharge.

laws/bylaws provided from time to time. • Explain the technical systems of winding engine e.g. size, capacity, power type, power capacity, depth of the shaft, total rope length, etc. • Discuss the prescribed operating guidelines, the standard operating procedures (SOPs) for mechanism and operation to the pre-start working device and associated systems (automatic speed recorder, depth indicator, slow banking, over speeding, etc.) • State the electrical control systems and equipment of operations drive motor mechanism etc. • Throw light on the common troubles and troubleshooting techniques. • Recall the sign ages, mining area signs, and other safety and emergency signals. • List the code of signaling and signaling systems and relevant standard operating procedures (SOPs) for the safe operation of the winding engine. • Explain how to respond to emergencies such as Ore, accident, major failure, etc. • State the speed fixed by the manager for man riding purposes.	
Classroom Aids	
LCD Projector, Laptop/Computer with internet, White Board, Flip Chart, Markers	
Tools, Equipment and Other Requirements	
Mine-shaft system; Winding Engine Room; Nose mask; Different types of winding systems (eg. steam winder, compressed air winder, electrical winders); Company's SOPs; Gloves, Safety Shoes, Safety goggles, Safety helmet, Fire extinguisher, Types of the log book, First Aid box	

Module 3: Perform operations of Winding Engine

Mapped to MIN/ N1507, v1.0

Terminal Outcomes:

- Demonstrate how to operate winding engine for lowering and raising of people/material

Duration: *60:00*	***Duration:*** *50:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss how to follow the code of signal and transmission of signal to operate the winding engine for lowering or raising of people/material. • Explain the different types of mines and detail of the mine a person is working in. • Describe about the mine organization, timekeeping, need for discipline and punctuality. • Discuss about the galleries in underground mine, dressing of roof, stable and unstable strata etc. • Throw light on the standing orders in force at the mine and the safety measures required in the vicinity of machinery. • Explain how to lower and raise the person at a speed fixed by the manager for man riding or at a speed approved by DGMS. • Discuss the duties of workmen, provision of wages, working hours and accident compensation as per the mines act. • Discuss all the norms and directives with regard to the operation of the winding engine. • Throw light on the knowledge of mining safety procedures and impact of violation of safety procedures. • Discuss the importance of ensuring that the station is not left unattended for any reason so that it is either locked or handed over to a successor. • Describe how to record the observations in a mandatory report at end of the shift. • State the types of documentation in the organization e.g. daily maintenance checklist and importance of the same. • Explain the risk and impact of not following defined procedures/work	• Display how to operate the winding engine for lowering or raising of men/material. • Show how to ensure the functioning of continuous type alarm bell provided for slow banking zone. • Demonstrate how to check the automatic contrivance to be in working order with respect to slow banking, over speeding and over winding. • Show how to avoid the jerk to the cage in starting, running and stopping the engine. • Demonstrate on how to monitor the condition of winding rope being laid on the winding drum regularly for any defects or deformation. • Apply appropriate techniques to check if all means of fire extinguishing equipment are in working order.

instructions. • Discuss how to ensure the housekeeping of the winding engine room and it should be kept properly maintained and any oil or grease should be removed immediately to avoid slippage and falling. • Discuss the rules and regulations of mine as per Standard Operating Procedure (SOP). • Discuss how to ensure the lock out and tag out scenario to avoid any untoward incident triggered due to unknowingly operation of machine / system under maintenance. • Shed light on the escalation matrix for reporting identified problems. • List the duties and responsibilities associated with his job role as per the employer. • Discuss the impact of delays and accidents to the company. • Discuss the locally prepared emergency response /disaster management plan. • Describe the different types of winding systems (e.g. steam winder, compressed air winder, electrical winders). • Explain the safety and hazard related knowledge and understanding with different types of winding mechanisms. • State the precautionary measures for hazards of different types for each type of mechanism. • Discuss the control systems/devices and associated safety measures/devices of the respective type of winding system. • Explain the function of different types of levers and brake/clutch mechanisms. • State the code of signal as specified in relevant statutes, organizational processes, and guidelines, relevant laws/bylaws provided from time to time. • Discuss the technical systems of winding engine e.g. size, capacity, power type, power capacity, depth of the shaft, total rope length, etc. • List the safety features of the winding engine.	
Classroom Aids	

LCD Projector, Laptop/Computer with internet, White Board, Flip Chart, Markers
Tools, Equipment and Other Requirements
Mine-shaft system; Winding Engine Room; Nose mask; Different types of winding systems (eg. steam winder, compressed air winder, electrical winders); Company's SOPs; Gloves, Safety Shoes, Safety goggles, Safety helmet, Fire extinguisher, Types of the log book, First Aid box

Module 4: Perform basic maintenance and troubleshooting of Winding Engine

Mapped to MIN/ N1508, v1.0

Terminal Outcomes:

- Describe how to perform routine maintenance and troubleshooting

Duration: *20:00*	***Duration:*** *50:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss how to adhere to the daily, weekly, monthly, and annual maintenance schedules and procedures. • Describe different types of mines and detail of the mine a person is working in. • State how to maintain proper records of maintenance. • Discuss the mine organisation, timekeeping, need for discipline and punctuality. • Explain about the galleries in underground mine, dressing of roof, stable and unstable strata, etc. • Explain how to ensure that the assembling and dismantling of the machine is carried out in accordance with the manufacturer's instructions. • State the code of practice in specific areas of the mine. • Cite the significance of fences. • Throw light on the standing orders in force at the mine and safety measures in the vicinity of machinery. • Discuss how to ensure the proper lockout and tag out has been done, to avoid any untoward incident trigger due to unknowing operation of machine/system under maintenance. • Discuss the duties of workmen and the provision of wages, working hours and accident compensation as per the mines act. • Discuss how to assess when the problem is beyond his competence and report the problem to suitably qualified and competent personnel. • Shed light on how to complete timely and legibly defect sheets as provided by the company.	• Show how to check the ropes of the mine-shaft system. • Demonstrate how to ensure that shaft conveyance is not used for the raising or lowering of persons until it has been checked with at least one complete trip up and down the working portion of the shaft post instances such as repairs performed to the winding installation, replacement done of rope, attachments, shaft conveyance or any other equipment, repairs performed to the shaft, stoppage in winding exceeding one-hour duration, the occurrence of any seismic event, etc. • Display how to ensure that the machine is on firm and level ground before attempting to carry out any maintenance activity. • Show how to ensure that no maintenance task on the engine is performed when it is running or still hot.

• Throw light on mining safety procedures and the impact of violation of safety procedures. • Discuss the types of documentation in the organization e.g. daily maintenance checklist and importance of the same. • State the risk and impact of not following defined procedures/work instructions. • Discuss the rules and regulations of mine as per Standard Operating Procedure (SOP). • State the escalation matrix for reporting identified problems. • Discuss all equipment including all the control levers and their operation (foot brake, operating levers, hoisting/un-hoisting, and locking devices); the pre-start working device and associated systems (automatic speed recorder, depth indicator, slow banking, over speeding etc.); electrical control systems and equipment of operations. • Describe the technical systems of the winding engine e.g. size, capacity, power type, power capacity, depth of the shaft, total rope length, etc. • Explain the basic fault diagnostics and troubleshooting techniques. • Describe the gear and transfer gearbox system of the winding engine. • Cite the basics of power drive units-electrical & mechanical. • Discuss the electrical systems including operation & maintenance of electrical motors, switchgear, and connections. • Describe about the oiling of components and lubricant specifications for different requirements.	
Classroom Aids	
LCD Projector, Laptop/Computer with internet, White Board, Flip Chart, Markers	
Tools, Equipment and Other Requirements	
Mine-shaft system; Winding Engine Room; Nose mask; Different types of winding systems (eg. steam winder, compressed air winder, electrical winders); Company's SOPs; Gloves, Safety Shoes, Safety goggles, Safety helmet, Fire extinguisher, Types of the log book, First Aid box	

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

Mapped to MIN/N1702, v1.0

Terminal Outcomes:

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

Duration: *10:00*	***Duration:*** *40:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain how to undertake "The Take-5(Personal Risk Assessment)" before commencement of any work (DGMS Tech. circulars2/2014). • Discuss how to 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). • List the precautions to be followed against U/G electrical appliances. • List 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. • Discuss 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. • Discuss how to follow appropriate Standard Operating Procedure while working near any isolated and sealed off area of the mine.	• 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.

• List the different types of machineries used in U/G mines. • 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. • Cite about the 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 how to follow process for reporting any unsafe act/condition in work area to the concerned person. • Describe how to use underground mine communication system. • Throw light on how to ensure positive isolation near the workplace if applicable. • Describe about 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 station and how to contact them in case of emergency. • State the importance of taking shelter at	

the miner's station during blasting operation. • Discuss about the safety equipment like safety shoes, safety belt, tight fit clothing, hand gloves, safety goggles, Gas Detector, Safety Lamp, Self-Contained Breathing Apparatus, gumboots, earplugs, Face Mask ,etc. 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 Crèche 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; MMR; MRR, Company's Safety Management Plan (SMP) and Emergency Management Plan (EMP);	

Module 6: 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: *10:00*	***Duration:*** *40:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• List the preventive measures against fire damp, white damp, black damp etc. • Explain how to undertake" 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 e.g. SOP for material handling in underground (U/G) mine. • Describe how to ensure that oil, grease, canvas or other inflammable material are stored in fire-proof receptacle. • 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 (like dust, water, mine gases etc.) due to U/G working environment. • Discuss Safety Management Plan (SMP) and Emergency Management Plan (EMP) and precautions against U/G electrical appliances. • Discuss the safety guideline specified by Directorate General of Mine Safety (DGMS) and selection process of person	• 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. • Apply appropriate techniques to ensure that every instrument, apparat us and equipment are DGMS approved before these are used. • Demonstrate how to ensure that Armoured Face conveyor (AFC) and chocks must be kept 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 long wall mining. • Show how to provide first aid to an injured person. • Role-play the situations on how to report any symptoms of illness to the shift-in charge.

for rescue training. • 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 use din 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 how to ensure positive isolation near the work place if applicable. • Discuss how to use appropriate Personal Protective Equipment (PPE) as per the requirement and safety equipment. • 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. • Summarise 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 like cleaning oil from ground (to avoid soil from getting damaged), etc. • Discuss the duties and rights of workers. • List the various 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 Crèche 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. • Outline the classification of coal mines as per the degree of gassiness of coal seams such as first degree, second degree, and third-degree mines. • List the precautions as per the gassiness of the coal mines. • Discuss about coal mines occupational disease such as pneumoconiosis or 'black lung' and their preventive measures. • List the roles, duties and responsibilities of rescue team members, rescue room and rescue station and how to contact them in case of emergency. • Enlist the correct steps for conducting any rescue work as per Mine Rescue Rule (MRR). • Summarize 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; MMR; MRR, Company's Safety Management Plan (SMP) and Emergency Management Plan (EMP);

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 Winding Engine Driver in the field of mining sector.	NA	-	-
OR						
ITI	NA	6	Relevant experience required as Winding Engine Driver in the field of mining sector.	NA	-	-
OR						
Diploma	Mining Engineering	5	Relevant experience required as Winding Engine Driver in the field of mining sector.	NA	-	-
OR						
B-Tech	Mining Engineering	4	Relevant experience required as Winding Engine Driver in the field of mining sector.	NA	-	-
OR						
CITS-NCIC	Machinist & Operator, Advance Machine Tool	1	Relevant experience in mining	NA	-	-

Trainer Certification	
Domain Certification	**Platform Certification**
MIN/Q1503, v2.0 Winding Operator. 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 Winding Engine Driver in the field of mining sector.	NA	-	-
OR						
ITI	NA	8	Relevant experience required as Winding Engine Driver in the field of mining sector.	NA	-	-
OR						
Diploma	Mining Engineering	7	Relevant experience required as Winding Engine Driver in the field of mining sector.	NA	-	-
OR						
B-Tech	Mining Engineering	6	Relevant experience required as Winding Engine Driver in the field of mining sector.	NA	-	-
OR						
CITS-NCIC	Machinist & Operator, Advance Machine Tool	1	Relevant experience in mining	NA	-	-

Assessor Certification	
Domain Certification	**Platform Certification**
MIN/Q1503, v2.0 Winding Operator. 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 is 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
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