



# Model Curriculum

**QP Name: Wire Saw Operator**

**QP Code: MIN/Q1201**

**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](http://www.skillcms.in)

## Table of Contents

Training Parameters.....	3
Program Overview .....	4
Training Outcomes.....	4
Compulsory Modules .....	4
Module Details.....	7
Module 1: Introduction to the mining industry and the job role of Wire Saw Operator.....	7
Module 2: Pre-operation checks of the Wire Saw Machine .....	8
Module 3: Recording and reporting the details of Wire Saw’s pre-operation inspection.....	10
Module 4: Pre operational arrangements, positioning, mounting and transportation of the Wire Saw machine .....	11
Module 5: Perform cutting operation and basic maintenance.....	13
Module 6: Carry Out Reporting and Documentation.....	14
Module 7: Follow Health and Safety guidelines.....	15
Module 8: Perform basic First-aid.....	16
Module 9: Use of fire Extinguisher.....	17
Module 10: Health and Hygiene .....	18
Module 11: Environmental safety.....	19
Employability Skills (60 Hours).....	21
Annexure.....	25
Trainer Requirements .....	25
Assessor Requirements.....	26
Assessment Strategy.....	27
References .....	29
Glossary.....	29
Acronyms and Abbreviations.....	29

## Training Parameters

<b>Sector</b>	MINING
<b>Sub-Sector</b>	Mining Operation
<b>Occupation</b>	Drilling/Cutting
<b>Country</b>	India
<b>NSQF Level</b>	4
<b>Aligned to NCO/ISCO/ISIC Code</b>	NCO-2015/8111.2901
<b>Minimum Educational Qualification and Experience</b>	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. Wire Saw Operator) of NSQF Level 3.0 with minimum education as 5th Grade pass with 2 years relevant experience
<b>Pre-Requisite License or Training</b>	Preferable Heavy Motor Vehicle Driving License
<b>Minimum Job Entry Age</b>	20 Years
<b>Last Reviewed On</b>	27/01/2022
<b>Next Review Date</b>	27/01/2025
<b>NSQC Approval Date</b>	27/01/2022
<b>QP Version</b>	2.0
<b>Model Curriculum Creation Date</b>	27/01/2022
<b>Model Curriculum Valid Up to Date</b>	27/01/2025
<b>Model Curriculum Version</b>	2.0
<b>Minimum Duration of the Course</b>	450 Hours
<b>Maximum Duration of the Course</b>	450 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 should have acquired the listed knowledge and skills.

- Carry out pre-operation checks and routine maintenance of the Wire Saw machine.
- Transport and mount the wire saw at the work site safely.
- Perform cutting operations effectively.
- Report any breakdown or abnormality of wire saw to the appropriate authority.
- Complete documentation on time and as per organizational requirements.
- Comply with health, safety and environmental norms applicable for mining operations.

### Compulsory Modules

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

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)
<b>Bridge Module</b>	<b>10:00</b>	<b>00:00</b>	<b>00:00</b>		<b>10:00</b>
Module 1 - Introduction to the mining industry and the job role of Wire Saw Operator	10:00	00:00	00:00		10:00
<b>MIN/N1201 –Prepare the Wire Saw for operations</b> <i>NOS Version No.-1</i> NSQF Level-4	<b>30:00</b>	<b>30:00</b>	<b>50:00</b>		<b>110:00</b>
Module 2 - Pre-operation checks of the Wire Saw Machine	20:00	20:00	40:00		80:00
Module 3 - Recording and reporting the details of Wire Saw's pre-operation inspection	10:00	10:00	10:00		30:00
<b>MIN/N1202 – Perform wire saw operations</b> <i>NOS Version No.-1</i> NSQF Level-4	<b>20:00</b>	<b>60:00</b>	<b>40:00</b>		<b>120:00</b>
Module 4 - Pre operational arrangements, positioning, mounting and transportation of the Wire Saw machine	10:00	30:00	20:00		60:00

Module 5 - Perform cutting operation and basic maintenance	10:00	30:00	20:00		60:00
<b>MIN/N1203 – Carry out reporting and documentation related to the Wire Saw Operation</b> <i>NOS Version No.-1</i> NSQF Level-4	<b>10:00</b>	<b>10:00</b>	<b>10:00</b>		<b>30:00</b>
Module 6 - Carry Out Reporting and Documentation	10:00	10:00	10:00		30:00
<b>MIN/N1703 –Follow Health, Safety, and Environmental guidelines for opencast mines (including Mine Vocational Training Rules)</b> <i>NOS Version No.-1</i> NSQF Level-4	<b>20:00</b>	<b>50:00</b>	<b>50:00</b>		<b>120:00</b>
Module 7 - Follow Health and Safety guidelines	04:00	10:00	10:00		24:00
Module 8 - Perform basic first-aid	04:00	10:00	10:00		24:00
Module 9 - Use of fire extinguisher	04:00	10:00	10:00		24:00
Module 10 - Health and Hygiene	04:00	10:00	10:00		24:00
Module 11 - Environmental safety	04:00	10:00	10:00		24:00
<b>DGT/VSQ/N0102: Employability Skills (60 Hours)</b> <i>NOS Version No. 1</i> NSQF Level- 4	<b>24:00</b>	<b>36:00</b>	<b>00:00</b>	-	<b>60:00</b>
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
<b>Total Duration</b>	<b>114:00</b>	<b>186:00</b>	<b>150:00</b>		<b>450:00</b>

# Module Details

## Module 1: Introduction to the mining industry and the job role of Wire Saw Operator

Bridge Module

### Terminal Outcomes:

- Discuss the scope of mining industry.
- Explain the role and responsibility of the Wire Saw Operator.

<b>Duration:</b> 10:00	<b>Duration:</b> 00:00
<b>Theory – Key Learning Outcomes</b>	<b>Practical – Key Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• Explain the importance of the mining industry.</li> <li>• Discuss the provision of wages, working hours, leaves, and accident compensation as per the Mines Act-1952.</li> <li>• List the different types of mines such as open cast mines, underground mines, etc.</li> <li>• Explain basic terminologies and machineries used in Opencast Mines.</li> <li>• Describe the working cycle of opencast mines.</li> <li>• Recall the role and responsibilities of wire saw operator in mining industry.</li> </ul>	
<b>Classroom Aids:</b>	
LCD Projector, Laptop/Computer with internet, White Board, Flip Chart, Markers	
<b>Tools, Equipment and Other Requirements</b>	
Posters for describing different types of mines	

## Module 2: Pre-operation checks of the Wire Saw Machine

*Mapped to MIN/N1201 v 1.0*

### Terminal Outcomes:

- Perform the steps to prepare the wire saw machine for operations.
- Discuss the functioning of various components of the wire saw machine and the process of pre-operation checks.

<b>Duration: 20:00</b>	<b>Duration: 20:00</b>
<b>Theory – Key Learning Outcomes</b>	<b>Practical – Key Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• Explain basic terminologies related to wire saw.</li> <li>• Discuss the various work related instructions to be given by the supervisor before the shift starts.</li> <li>• Recall manufacturer's instructions to be followed for care and safe operation of the wire saw machine.</li> <li>• Explain the importance of reporting any mechanic/electric fault of the wire saw machine to the concern person.</li> <li>• List the different types of wire Saws, their specifications and usage.</li> <li>• Explain the importance of all the meter/gauges available on the instrument panel.</li> <li>• Summarise the different types of controls provided in the wire saw, their location and usage.</li> <li>• Explain the different types of wire saw bits and their usage.</li> <li>• Describe the process of routine checks, which are essential before starting the wire saw machine as per the organization/original equipment manufacturer (OEM).</li> <li>• List out all the safety provisions for the wire saw machine.</li> <li>• Discuss the importance of various dust reduction measures and their effective usage.</li> <li>• Discuss the process of reporting any problem.</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate how to set the wire saw machine on a level ground that is free from obstacles.</li> <li>• Show the process of examining the various controls, gauges, warning lamps and other safety devices.</li> <li>• Demonstrate how to inspect all body components for cracks and bearing wear.</li> <li>• Show how to confirm that the crown blocks are mounted securely on the wire saw machine.</li> <li>• Perform the steps of checking the condition of wire saw bits and changing the bits and joints.</li> <li>• Display the process of checking that all hoses connections are in order while using compressed air wire saw.</li> <li>• Demonstrate the process of greasing different parts of the wire saw machine.</li> <li>• Apply appropriate techniques to check available dust reduction measures.</li> <li>• Demonstrate how to confirm that no other worker/s travel on or stand near the wire-sawing site.</li> </ul>
<b>Classroom Aids:</b>	
LCD Projector, Laptop/Computer with internet, White Board, Flip Chart, Markers	
<b>Tools, Equipment and Other Requirements</b>	

Wire Saw, Diamond Segment Wire, Diamond Chain Saw, Electric Tester, Spanner Set, Gang Saw  
Helmet, Dust Mask, Goggles, Ear Plug, Gloves, Reflective Jacket, Safety Belt, Gum Boots, Slide  
wrench, Pre-check list format, Grease Can, Grease Gun

## Module 3: Recording and reporting the details of Wire Saw's pre-operation inspection

*Mapped to MIN/N1201 v 1.0*

### Terminal Outcomes:

- Demonstrate the recording and reporting process of wire saw machine's pre-operation details.

<b>Duration:</b> 10:00	<b>Duration:</b> 10:00
<b>Theory – Key Learning Outcomes</b>	<b>Practical – Key Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• Explain the importance of recording and reporting pre-operation inspection details.</li> <li>• List important parameters that need to be maintained in the logbook before starting the wire saw machine.</li> <li>• Discuss the process of reporting the problems which are beyond one's purview.</li> <li>• Illustrate the reporting hierarchy to be followed for identified problems.</li> </ul>	<ul style="list-style-type: none"> <li>• Role-play the situation on how to report details of pre-operation inspection to concerned person.</li> <li>• Fill the logbook with required details.</li> </ul>
<b>Classroom Aids:</b>	
LCD Projector, Laptop/Computer with internet, White Board, Flip Chart, Markers	
<b>Tools, Equipment and Other Requirements</b>	
Log books, pre-checklist format	

## Module 4: Pre operational arrangements, positioning, mounting and transportation of the Wire Saw machine

*Mapped to MIN/N1202 v 1.0*

### Terminal Outcomes:

- Demonstrate the process of positioning, mounting and transporting the wire saw machine.
- Discuss the various factors/parameters to be considered for planning the work and selecting the suitable capacity of wire saw machine as per the work requirement.

<b>Duration: 10:00</b>	<b>Duration: 30:00</b>
<p><b>Theory – Key Learning Outcomes</b></p> <ul style="list-style-type: none"> <li>• Explain the importance of following all necessary precautions before towing the Wire Saw to a distant site.</li> <li>• List the important factors/parameters to be considered for organizing and planning the tasks/works according to the supervisor's/site engineer's instructions.</li> <li>• Discuss various parameters for selecting the wire saw machine of suitable capacity for required work.</li> <li>• Explain the replacement process of bits and joints of the wire.</li> <li>• Discuss the various aspects for organizing daily consumables including cutting bits etc., according to the day's plan.</li> <li>• Recall the operation process of different sub-assemblies such as drive wheel, hydraulic system, power unit, water supply system, wire tensioning arm, wire length adjustment pulley etc.</li> <li>• Explain the procedure of setting up of the Wire Saw for various tasks - horizontal, vertical or flush cutting.</li> <li>• List the various signs and symbols used in various mines sites.</li> <li>• Illustrate signages, mining area-specific signs, and other safety and emergency signals.</li> <li>• State all the bye-laws of DGMS (Directorate General of Mines Safety) related to wire sawing operations.</li> <li>• Explain various processes of basic maintenance such as replacing rubber on the pulleys, cleaning the diamond wire guard and drive wheel guard and keeping grip points free from oil and grease.</li> </ul>	<p><b>Practical – Key Learning Outcomes</b></p> <ul style="list-style-type: none"> <li>• Show the process of cleaning the site.</li> <li>• Demonstrate how to shift the machine to the place of work site.</li> <li>• Exhibit the steps of operating propelling motor control levers to smoothly move the wire saw machine in all four directions.</li> <li>• Demonstrate the steps of raising the Wire Saw guide to 1.5m above ground level and making it horizontal.</li> <li>• Display how to erect appropriate signages, barricades as required in the work area before positioning and mounting the wire saw.</li> <li>• Apply appropriate techniques to confirm that the wire saw is mounted on a stable base.</li> <li>• Show how to adjust the tracks by methodically manipulating the positions of the oscillation cylinder valve and hydraulic track valve.</li> </ul>
<p><b>Classroom Aids:</b></p> <p>LCD Projector, laptop/computer, white board, Flip Chart, Markers</p>	

### **Tools, Equipment and Other Requirements**

Wire Saw Machine with appropriate electric control panel, Diamond Segment Wire, Diamond Chain Saw, Electric Tester, Spanner Set, Gang Saw, Helmet, various types of joints, bits, Dust Mask, Goggles, Ear Plug, Gloves, Reflective Jacket, Safety Belt, Gum Boots, Slide wrench

## Module 5: Perform cutting operation and basic maintenance

### Mapped to MIN/N1202 v 1.0

#### Terminal Outcomes:

- Demonstrate cutting operation of the wire saw machine.
- Discuss the importance of following the safety norms.

<b>Duration: 10:00</b>	<b>Duration: 30:00</b>
<p><b>Theory – Key Learning Outcomes</b></p> <ul style="list-style-type: none"> <li>• Recall wire sawing pattern and sequence of operations.</li> <li>• Discuss the method and significance of twisting the diamond wire before joining connectors.</li> <li>• Explain the importance of following the SOP while wire sawing operation.</li> <li>• Discuss the importance of the instrument panel and various controls.</li> <li>• Recall safety guidelines for wire Saw operations specified by Directorate General of Mines Safety (DGMS).</li> </ul>	<p><b>Practical – Key Learning Outcomes</b></p> <ul style="list-style-type: none"> <li>• Demonstrate the process of mounting and using the water supply nozzle for cooling of the wire while cutting.</li> <li>• Perform the steps to cut and set the optimal speed of driving and cutting to ensure best results.</li> <li>• Show how to use various systems in the remote control unit to control the hydraulic oil flow rate, wire tension, longitudinal advance for cutting direction, potentiometer for speed adjustment etc.</li> <li>• Demonstrate the process of carrying out basic maintenance such as replacing rubber on the pulleys, cleaning the diamond wire guard and drive wheel guard, keeping grip points free from oil and grease etc.</li> <li>• Demonstrate how to confirm that all associated parts (couplings/rods etc.) are used to their maximum potential, while ensuring their sustainability to reduce downtime and wastage.</li> <li>• Apply appropriate safety precautions against hazards during the Wire Sawing operation.</li> </ul>
<p><b>Classroom Aids:</b></p> <p>LCD Projector, laptop/computer, white board, Flip Chart, Marker</p>	
<p><b>Tools, Equipment and Other Requirements</b></p> <p>Wire Saw machine, Diamond Segment Wire, Diamond Chain Saw, Electric Tester, Spanner Set, Gang Saw,, Helmet, Dust Mask, Goggles, Ear Plug, Gloves, Reflective Jacket, Safety Belt, Gum Boots, Slide wrench</p>	

## Module 6: Carry Out Reporting and Documentation

*Mapped to MIN/N1203 v 1.0*

### Terminal Outcomes:

- Describe the process of reporting and documentation related to wire saw operations
- Differentiate between different types of documents.

<b>Duration:</b> 10:00	<b>Duration:</b> 10:00
<b>Theory – Key Learning Outcomes</b>	<b>Practical – Key Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• List out different types of documents used in an organization.</li> <li>• Explain the procedure of reporting any incident/accident etc.</li> <li>• Discuss the handover and takeover procedure.</li> <li>• Recall all the parameters mentioned in logbooks.</li> <li>• Outline the importance of making the documents available to all appropriate authorities for inspection on time.</li> <li>• List the important details of the machine operations that need to be maintained in the logbook.</li> </ul>	<ul style="list-style-type: none"> <li>• Prepare all the relevant documents required for the inspection regularly.</li> <li>• Fill all the relevant documents correctly.</li> <li>• Demonstrate the reporting procedure of daily activities.</li> <li>• Prepare a record of the details of the machine operations accurately in the appropriate format.</li> </ul>
<b>Classroom Aids:</b>	
LCD Projector, laptop/computer with internet, white board, Flip Chart, Markers	
<b>Tools, Equipment and Other Requirements</b>	
Maintenance based log books, Operation based log book, check list, MCDR based logbooks	

## Module 7: Follow Health and Safety guidelines

Mapped to MIN/N1703 v 1.0

### Terminal Outcomes:

- Demonstrate the various health and safety related activities as per DGMS.
- Discuss the various safety precautions to be taken.

<b>Duration: 04:00</b>	<b>Duration: 10:00</b>
<b>Theory – Key Learning Outcomes</b>	<b>Practical – Key Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• Recall safety, health, and security-related regulations/guidelines relevant to one's role</li> <li>• Recall the safety regulations of shot firing/blasting activities</li> <li>• Explain the role of workmen inspector and safety committee.</li> <li>• Explain the preventive measures to be taken for the occupational diseases.</li> <li>• Recall the management plan to be followed in case of the emergency/disaster</li> <li>• Illustrate signages, mining area-specific signs, and other safety and emergency signals.</li> <li>• Recall all safety precautions to be taken while handling heavy equipment.</li> <li>• Recall the SOP to be followed while working near the electrical supply and equipment.</li> <li>• Explain the impact of the violation of safety procedures.</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate the various steps of safe material handling.</li> <li>• Demonstrate the use of Personal Protective Equipment (PPE) appropriately.</li> <li>• Demonstrate the correct process of handling and transporting of dummy explosive</li> <li>• Demonstrate the procedure of working at height.</li> </ul>
<b>Classroom Aids:</b>	
LCD Projector, laptop/computer, white board, Flip Chart, Markers	
<b>Tools, Equipment and Other Requirements</b>	
Wire Saw machine, Vehicle Driver Tool Box, Helmet, Dust Mask, Goggles, Ear Plug, Gloves, Reflective Jacket, Safety Belt, Gum Boots, Posters of Signages	

## Module 8: Perform basic First-aid

Mapped to MIN/N1703 v 1.0

### Terminal Outcomes:

- Demonstrate how to provide first aid to an injured person in various situations.
- Discuss the applicability of first-aid station and first-aid room as per the Mines Act.
- Discuss the composition of first-aid box.

<b>Duration: 04:00</b>	<b>Duration: 10:00</b>
<b>Theory – Key Learning Outcomes</b>	<b>Practical – Key Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• Explain the importance of First-Aid.</li> <li>• List the first aid box items</li> <li>• Explain the use of components of the first aid box.</li> <li>• Discuss first-aid procedure for different high-risk situations pertaining to various mining operations.</li> <li>• Recall all mandatory items to be available in First-aid room and First-aid station as per DGMS.</li> <li>• Explain different types of injuries and occupational disease.</li> </ul>	<ul style="list-style-type: none"> <li>• Prepare a sample First-aid kit.</li> <li>• Prepare the stretcher using various other item such as ropes, clothes, belt etc.</li> <li>• Demonstrate the process of using various first-aid item.</li> <li>• Demonstrate the CPR (Cardio-Pulmonary Resuscitation) method.</li> <li>• Dramatize the emergency procedures during accidents or hazardous situations.</li> </ul>
<b>Classroom Aids:</b>	
LCD Projector, laptop/computer with internet, white board, Flip Chart, Markers	
<b>Tools, Equipment and Other Requirements</b>	
First Aid Box, Helmet, Dust Mask, Goggles, Ear Plug, Gloves, Reflective Jacket, Safety Belt, Gum Boots, first-aid chart, stretcher, splint, sample emergency plan rope, clothes, belt, CPR Chart	

## Module 9: Use of fire Extinguisher

*Mapped to MIN/N1703 v 1.0*

### Terminal Outcomes:

- Discuss different types of fires and their control mechanism.
- Demonstrate the steps for controlling different types of fires.

<b>Duration: 04:00</b>	<b>Duration: 10:00</b>
<b>Theory – Key Learning Outcomes</b>	<b>Practical – Key Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• Differentiate between different types of fires.</li> <li>• Explain the fire triangle.</li> <li>• Discuss all the three components in different types of fires.</li> <li>• Recall safety regulations and procedures in the event of fire hazards.</li> <li>• Discuss preventive measures to be taken in case of fire hazards.</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate the steps for checking the condition of various types of fire extinguishers.</li> <li>• Demonstrate the steps of operating various types of fire extinguishers.</li> <li>• Dramatize the support to control different types of fires in emergency.</li> </ul>
<b>Classroom Aids:</b>	
LCD Projector, laptop/computer with internet, white board, Flip Chart, Markers	
<b>Tools, Equipment and Other Requirements</b>	
Various types of fire extinguisher, sand, water, Bucket, Helmet, Dust Mask, Goggles, Ear Plug, Gloves, Reflective jacket, Fire Extinguisher Cylinders	

## Module 10: Health and Hygiene

*Mapped to MIN/N1703 v 1.0*

### Terminal Outcomes:

- Discuss the importance of maintaining personal and worksite hygiene.
- Demonstrate the process of disinfecting the machine/tools/worksite and correct way of wearing and removing PPE's.

<b>Duration: 04:00</b>	<b>Duration: 10:00</b>
<b>Theory – Key Learning Outcomes</b>	<b>Practical – Key Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• Explain the importance of maintaining personal hygiene at worksite.</li> <li>• State the importance of reporting any symptoms of illness to the supervisor.</li> <li>• Discuss organizational hygiene and sanitation guidelines.</li> <li>• Explain the precautions to be taken against infectious disease.</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate how to sanitize and disinfect one's allocated machine/tools/worksite before starting any work /task.</li> <li>• Display correct way of wearing and removing PPE's.</li> <li>• Show how to wash hands with alcohol based sanitisers/soap properly.</li> <li>• Show how to maintain hygiene at the worksite.</li> <li>• Role-play of a situation on how to identify and report symptoms of illnesses, during the work or before coming to work.</li> </ul>
<b>Classroom Aids:</b>	
LCD Projector, laptop/computer with internet, white board, Flip Chart, Markers	
<b>Tools, Equipment and Other Requirements</b>	
Helmet, Dust Mask, Goggles, Ear Plug, Gloves, Reflective jacket, sanitizers, soap, disinfectants	

## Module 11: Environmental safety

*Mapped to MIN/N1703 v 1.0*

### Terminal Outcomes:

- Demonstrate the various steps to maintain surrounding environment.
- Discuss the various steps for minimizing the environmental hazards caused due to various mining operations.

<b>Duration:</b> 04:00	<b>Duration:</b> 10:00
<b>Theory – Key Learning Outcomes</b>	<b>Practical – Key Learning Outcomes</b>
<ul style="list-style-type: none"> <li>• Explain the ways to reduce environmental hazards caused due to related mining operations</li> <li>• List the common sources of pollution in the mines.</li> <li>• Recall the mine safety standards including light illumination level, noise levels, dust level, pollutants, etc. at the work-site</li> <li>• Explain the process of top soil removal and management.</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate the process of collecting, storing and disposing off the hazardous material and waste (like used oil, lubricant, battery, etc.) in compliance with worksite guidelines.</li> <li>• Exhibit the various processes to prevent mixing of topsoil with waste.</li> <li>• Demonstrate the washing steps of HEMM at the designated location.</li> <li>• Demonstrate the various activities to improve the productivity of the machine for material/fuel conservation.</li> <li>• Demonstrate the various mineral conservation practices described by the organization in accordance with MCDR-2017 (Mineral Conservation and Development Rules).</li> </ul>
<b>Classroom Aids:</b>	
LCD Projector, laptop/computer, white board, Flip Chart, Markers	
<b>Tools, Equipment and Other Requirements</b>	
Helmet, Dust Mask, Goggles, Ear Plug, Gloves, Reflective Jacket, Safety Belt, Gum Boots, 5-S poster, Poster related to occupational health diseases	



## Employability Skills (60 Hours)

Mapped to DGT/VSQ/N0102, v1.0

<i>Key Learning Outcomes</i>	
<b>Introduction to Employability Skills</b>	<b>Duration: 1.5 Hours</b>
<ol style="list-style-type: none"> <li>1. Discuss the Employability Skills required for jobs in various industries</li> <li>2. List different learning and employability related GOI and private portals and their usage</li> </ol>	
<b>Constitutional values - Citizenship</b>	<b>Duration: 1.5 Hours</b>
<ol style="list-style-type: none"> <li>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</li> <li>4. Show how to practice different environmentally sustainable practices.</li> </ol>	
<b>Becoming a Professional in the 21st Century</b>	<b>Duration: 2.5 Hours</b>
<ol style="list-style-type: none"> <li>5. Discuss importance of relevant 21st century skills.</li> <li>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.</li> <li>7. Describe the benefits of continuous learning.</li> </ol>	
<b>Basic English Skills</b>	<b>Duration: 10 Hours</b>
<ol style="list-style-type: none"> <li>8. Show how to use basic English sentences for everyday conversation in different contexts, in person and over the telephone</li> <li>9. Read and interpret text written in basic English</li> <li>10. Write a short note/paragraph / letter/e-mail using basic English</li> </ol>	
<b>Career Development &amp; Goal Setting</b>	<b>Duration: 2 Hours</b>
<ol style="list-style-type: none"> <li>11. Create a career development plan with well-defined short- and long-term goals</li> </ol>	
<b>Communication Skills</b>	<b>Duration: 5 Hours</b>
<ol style="list-style-type: none"> <li>12. Demonstrate how to communicate effectively using verbal and nonverbal communication etiquette.</li> <li>13. Explain the importance of active listening for effective communication</li> <li>14. Discuss the significance of working collaboratively with others in a team</li> </ol>	
<b>Diversity &amp; Inclusion</b>	<b>Duration: 2.5 Hours</b>
<ol style="list-style-type: none"> <li>15. Demonstrate how to behave, communicate, and conduct oneself appropriately with all genders and PwD</li> <li>16. Discuss the significance of escalating sexual harassment issues as per POSH act.</li> </ol>	
<b>Financial and Legal Literacy</b>	<b>Duration: 5 Hours</b>
<ol style="list-style-type: none"> <li>17. Outline the importance of selecting the right financial institution, product, and service</li> <li>18. Demonstrate how to carry out offline and online financial transactions, safely and securely</li> <li>19. List the common components of salary and compute income, expenditure, taxes, investments etc.</li> <li>20. Discuss the legal rights, laws, and aids</li> </ol>	
<b>Essential Digital Skills</b>	<b>Duration: 10 Hours</b>
<ol style="list-style-type: none"> <li>21. Describe the role of digital technology in today's life</li> <li>22. Demonstrate how to operate digital devices and use the associated applications and features, safely and securely</li> <li>23. Discuss the significance of displaying responsible online behavior while browsing, using various social media platforms, e-mails, etc., safely and securely</li> <li>24. Create sample word documents, excel sheets and presentations using basic features</li> <li>25. utilize virtual collaboration tools to work effectively</li> </ol>	
<b>Entrepreneurship</b>	<b>Duration: 7 Hours</b>
<ol style="list-style-type: none"> <li>26. Explain the types of entrepreneurship and enterprises</li> <li>27. Discuss how to identify opportunities for potential business, sources of funding and associated financial and legal risks with its mitigation plan</li> <li>28. Describe the 4Ps of Marketing-Product, Price, Place and Promotion and apply them as per requirement</li> <li>29. Create a sample business plan, for the selected business opportunity</li> </ol>	

<b>Customer Service</b>	<b>Duration: 5 Hours</b>
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	
<b>Getting Ready for apprenticeship &amp; Jobs</b>	<b>Duration: 8 Hours</b>
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"> <li>• have good communication skills</li> <li>• be well versed in English</li> <li>• have digital skills</li> <li>• have attention to detail</li> <li>• be adaptable</li> <li>• have willingness to learn</li> </ul>
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 <b>80%</b>  <b>OR</b>  Certified in 120-, 90-hour Employability NOS (2022), with a minimum score of <b>80%</b>	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"> <li>• have good communication skills</li> <li>• be well versed in English</li> <li>• have basic digital skills</li> </ul>
Certified Master Trainer	Qualification Pack: Master Trainer (MEP/Q2602)	-	-	3	EEE training of Management SSC (MEPSC) (155 hours)	<ul style="list-style-type: none"> <li>• have attention to detail</li> <li>• be adaptable</li> <li>• have willingness to learn</li> <li>• be able to grasp concepts fast and is creative with teaching practices and likes sharing back their learning with others</li> </ul>

Master Trainer Certification	
Domain Certification	Platform Certification
Certified in 60-hour Employability NOS (2022), with a minimum score of <b>90%</b> .  <b>OR</b>  Certified in 120-, 90-hour Employability NOS (2022), with a minimum score of <b>90%</b>	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.

# Annexure

## Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training Experience		Remarks
		Years	Specialization	Years	Specialization	
Class X	NA	6	Wire saw operations in the field of mining sector.	NA	-	-
<b>OR</b>						
ITI	Diesel/Mechanical /Fitter	6	Wire saw operations in the field of mining sector.	NA	-	-
<b>OR</b>						
Diploma	Mining/ Mechanical	5	Wire saw operations in the field of mining sector.	NA	-	-
<b>OR</b>						
B-Tech	Mining/ Mechanical	4	Wire saw operations in the field of mining sector.	NA	-	-
<b>OR</b>						
CITS-NCIC	Machinist & Operator, Advance Machine Tool	1	Relevant experience in mining	NA	-	-

Trainer Certification	
Domain Certification	Platform Certification
MIN/Q1201, v2.0 Wire Saw 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	Wire Saw operations in the field of mining sector.	NA	-	-
<b>OR</b>						
ITI	Diesel/Mechanical /Fitter	8	Wire Saw operations in the field of mining sector.	NA	-	-
<b>OR</b>						
Diploma	Mining/ Mechanical	7	Wire Saw operations in the field of mining sector.	NA	-	-
<b>OR</b>						
B-Tech	Mining/ Mechanical	6	Wire Saw operations in the field of mining sector.	NA	-	-
<b>OR</b>						
CITS-NCIC	Machinist & Operator, Advance Machine Tool	1	Relevant experience in mining	NA	-	-

Assessor Certification	
Domain Certification	Platform Certification
MIN/Q1201, v2.0 Wire Saw 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 ratios.

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 numbers 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
Bye-laws	Bye-laws are regulation made by a local authority or corporation.
Flush cutting	Flush cutting refers to the process by which flat concrete surfaces are cut out in a straight line. Flush cutting saws are used for this process and are essential for creating precise straight cuts on concrete at any depth.
Maneuver	Maneuver is a movement or series of moves requiring skill and care.
Purview	Purview is the scope of the influence or concerns of something.
Training Outcome	Training outcome is a statement of what a learner will know, understand and be able to do <b>upon the completion of the training</b> .
Terminal Outcome	Terminal outcome is a statement of what a learner will know, understand and be able to do <b>upon the completion of a module</b> . A set of terminal outcomes help to achieve the training outcome.

## Acronyms and Abbreviations

Term	Description
QP	Qualification Pack
LCD	Liquid Crystal Display
MCDR	Mineral Conservation and Development Rules
NSQF	National Skills Qualification Framework
NSQC	National Skills Qualification Committee
NOS	National Occupational Standards
DGMS	Directorate General of Mines Safety
OEM	Original Equipment Manufacturer
NA	Not Applicable
SIP	Skill India Portal
SOP	Standard Operating Procedure