



Model Curriculum

QP Name: Jumbo Drill Operator

Electives: Underground Coal/ Underground Metal

QP Code: MIN/Q1203

QP Version: 3.0

NSQF Level: 4

Model Curriculum Version: 3.0

Skill Council for Mining Sector || B-311, Okhla Industrial Area, Phase-I, New Delhi-110020
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Training Parameters

Sector	Mining
Sub-Sector	Mining Operation
Occupation	Drilling/Cutting
Country	India
NSQF Level	4
Aligned to NCO/ISCO/ISIC Code	NCO-2015/8111.0100, NCO-2015/8111.0200
Minimum Educational Qualification and Experience	8th grade pass plus 2-year NTC plus 1 Year NAC OR 8th pass plus 1-year NTC plus 1-Year NAC plus CITS OR 10th grade pass and pursuing continuous schooling OR 10th grade pass with 2 years relevant experience OR Previous relevant Qualification (Jr. Jumbo Operator) of NSQF Level 3.0 with minimum education as 5th Grade pass with 2 years relevant experience
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	3.0
Model Curriculum Creation Date	27/01/2022
Model Curriculum Valid Up to Date	27/01/2025
Model Curriculum Version	3.0
Minimum Duration of the Course	510 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 prepare jumbo drill machine for operation
- Show how to perform operation on jumbo drill
- Display how to perform routine maintenance and troubleshooting on the jumbo drill machine
- Explain health, safety and environmental guidelines to be followed for underground coal and Metalliferous mines

Compulsory Modules

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

NOS and Module Details	Theory Duration (Hours)	Practical Duration (Hours)	On-the-Job Training Duration (Mandatory) (hours)	On-the-Job Training Duration (Recommended) (Hours)	Total Duration (Hours)
Bridge Module	10:00	00:00	00:00	-	10:00
Module 1: Introduction to the Job role of Jumbo Drill Operator	10:00	00:00	00:00	-	10:00
MIN/N1208 - Prepare Jumbo drill machine for operation <i>NOS Version No. 1.</i> NSQF Level: 4	30:00	20:00	60:00	-	110:00
Module 2: Prepare Jumbo drill machine for operation	30:00	20:00	60:00	-	110:00
MIN/N1209- Perform Operations on Jumbo Drill <i>NOS Version No. 1.0</i> NSQF Level: 4	30:00	40:00	50:00	-	120:00
Module 3: Perform Operations on Jumbo Drill	30:00	40:00	50:00	-	120:00
MIN/N1210- Perform routine maintenance and troubleshooting on the jumbo drill machine <i>NOS Version No. 1.0</i> NSQF Level: 4	30:00	40:00	20:00	-	90:00
Module 4: Perform					

routine maintenance and troubleshooting on the jumbo drill machine	30:00	40:00	20:00	-	90:00
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	124:00	136:00	130:00	-	390:00

Elective Modules

Elective 1: Underground Coal

NOS and Module Details	Theory Duration (Hours)	Practical Duration (Hours)	On-the-Job Training Duration (Mandatory) (Hours)	On-the-Job Training Duration (Recommended) (Hours)	Total Duration (Hours)
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	20:00	50:00	50:00	-	120:00
Module 5: Follow Health,	20:00	50:00	50:00	-	120:00

Safety and Environmental Guidelines for underground coal mines					
Total Duration	20:00	50:00	50:00	-	120:00

Elective 2: Underground Metal

NOS and Module Details	Theory Duration (Hours)	Practical Duration (Hours)	On-the-Job Training Duration (Mandatory) (Hours)	On-the-Job Training Duration (Recommended) (Hours)	Total Duration (Hours)
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	20:00	50:00	50:00	-	120:00
Module 6: Follow Health, Safety and Environmental Guidelines for underground metal mines	20:00	50:00	50:00	-	120:00
Total Duration	20:00	50:00	50:00	-	120:00

Module Details

Module 1: Introduction to Job role of Jumbo Drill Operator

Bridge Module

Terminal Outcomes:

- Discuss the scope of mining industry
- Explain the role and responsibility of the Jumbo Drill Operator

<i>Duration:10:00</i>	<i>Duration:00:00</i>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> ● Describe the concept of underground mining Operation ● Discuss the role and the importance of the Jumbo Drill Operator ● Discuss Regulatory context specified to work in Underground Mines ● Explain the characteristic features of Metal mines and Coal Mines ● Explain provision of wages, working hours and accident compensation as per the Mine Act) 	
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 and associated operations.	

Module 2: Prepare Jumbo drill machine for operation

Mapped to MIN/N1208, v1.0

Terminal Outcomes:

- Demonstrate how to conduct pre-operation checks to ensure jumbo drilling rig is safe to use.

<i>Duration:30:00</i>	<i>Duration:20:00</i>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> ● Explain how to prioritize and schedule work required by the department. ● Describe the different types of mines and detail of the mine a person is working in. ● Discuss about mine organisation, time keeping, need for discipline and punctuality. ● Explain benching in quarries, dressing of overhangs, undercuts, fencing, first aid and hygiene. ● State the code of traffic in specific areas of mine and significance of fences. ● Discuss standing orders in force at the mine. ● Throw light on shot-firing and safety regulations. ● Discuss about tramways and siding, haulage rooms, winding rooms, boilers, electrical gears. ● Discuss the duties of workmen. ● Explain how to clear the drilling site off other mine workers to avoid any accidents. ● Discuss the provision of wages, working hours and accident compensation as per Mines act. ● Discuss the manufacturer’s instructions which apply to the care and safe operation of the drill. ● Recall the technical problems that may arise in jumbo during the operation. ● Summarize mining safety procedures. ● State the impact of violation of safety procedures. ● Discuss the refresher training as per fourth schedule MVTR (1966) within one month of 	<ul style="list-style-type: none"> ● Show how to perform minor repairs, such as changing striker bars, couplings, water tubes and hose clamps. ● Demonstrate how to check various controls, gauges, warning lamp and other safety devices, to ensure drilling equipment is in safe operating condition. ● Display how to ensure that crown blocks are mounted securely. ● Demonstrate how to check all hose connections are in order, in case of a compress air drill. ● Show how to perform visual checks to detect cracks, wear and tear or any damage that could result in structural weakness. ● Demonstrate how to apply grease to all greasing pins and pivot points. ● Apply suitable techniques to check under carriage and superstructure in the drill. ● Demonstrate how to keep the footplates and steps clean & free from mud, dirt and oil. ● Display how to conduct prestart check including oil level, coolant level, air pressure, air leakages, etc. ● Show how to check earthing of drill machine and other safety aspects such as fire, etc. ● Display how to check ground conditions at the face and implement ground control measures, according to site requirements. ● Demonstrate how to record all activities in maintenance logbook before starting the drill.

joining duties following absence from duties for a period exceeding one year.

- Explain how to ensure working area is safe for personnel and equipment to perform work such as ensuring electrical installations and other services are clear of the drilling area.
- Discuss the job specific documents e.g. daily maintenance checklist and discuss importance of the same.
- Cite the risk and impact of not following defined Standard Operating Procedure (SOP).
- State the escalation matrix for reporting identified problems.
- Discuss the impact of accidents and damage of equipment to the company.
- Throw light on the systematic support rule (SSR) and emergency management plan (EMP).
- State the specifications of jumbo drilling rig and its specific use.
- Discuss the proper use and care of machine and cables, picks, bits, sharpening, shaping, etc.
- State the specification and details of jumbo drills used in mines.
- Discuss about the instrument panel, various controls, their location and operation.
- Describe the lubrication process of jumbo drilling rig.
- Discuss about the various levers and switches in order to operate the drill properly.
- Enlist different types of drill bits and their uses.
- List the common terminology vis-à-vis jumbo drilling.
- Recall the precautions against falls/gas/coal dust.
- Discuss about the routine checks essential before starting operations.
- Explain the operation of large jumbos single/ double boom.

- Role play the situation on how to inform supervisor of problems that are beyond scope of his role.

<ul style="list-style-type: none"> ● Recall the signage, mining area signs and other safety and emergency signals. ● Explain the interlocking of drill safety aspects etc. ● Discuss the construction and operation of different assemblies and sub-assemblies. 	
<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>single and/ double boom jumbo drilling rig, controls, gauges, warning lamp, crown blocks, Projector System, Drilling machine, steel tape 1 meter, direct reading vernier calliper, Hydraulic jack, jib crane, chisel bits / compressed air / couplings/ rods etc., controls, gauges, warning lamp, Diesel Engines, Electric Motors and compressors, battery charger, hammer, Signage, 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, Different types of logbook, SSR, EMP</p>	

Module 3: Perform Operations on Jumbo Drill

Mapped to MIN/N1209, v1.0

Terminal Outcomes:

- Demonstrate how to perform jumbo drill operation

<i>Duration:30:00</i>	<i>Duration:40:00</i>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> ● Explain how to follow plans to determine location, spacing, depth and angle of holes. ● Describe the different types of mines and detail of the mine a person is working in. ● Discuss about mine organisation, time keeping, need for discipline and punctuality. ● Describe benching in quarries, dressing of overhangs, undercuts, fencing, first aid and hygiene. ● Discuss the mine instruction plan, hole design line, gradient and profile. ● State the code of traffic in specific areas of mine and significance of fences. ● Discuss standing orders in force at the mine, shot-firing and safety regulations. ● List all the necessary precautions to be adhered to before towing the drill to a distant site. ● Discuss about tramways and siding, haulage rooms, winding rooms, boilers, electrical gears. ● Discuss the duties of workmen. ● Recall technical problems that may arise. ● Explain how to work with technical supervisor in quality and safety initiatives. ● Discuss the provision of wages, working hours and accident compensation as per Mines act. ● Discuss how to place guards at all entrances to the blast and blast according to project standards and remove the guards after blastings. ● Summarize mining safety procedures and the impact of violation of safety procedures. 	<ul style="list-style-type: none"> ● Display how to assess ground conditions at the work area in terms of sounding, scaling and washing-down of face. ● Demonstrate how to implement ground control according to SSR. ● Show how to mark up the faces in accordance with geological, statutory and survey specifications. ● Demonstrate how to drill a number of drive drill patterns using a mechanized hydraulic or electric Jumbo drill to suit conditions of the drive. ● Perform the steps on how to install the ground support except cable bolts and shotcrete. ● Apply appropriate technique to install the mine services when required. ● Show how to ensure that the OEM prescribed limit for angles of inclination are followed during setting up of drill. ● Discuss how to complete daily reports on equipment and workplace and submit written and verbal reports to the supervisor. ● Perform the steps on how to check of Audio Visual (AV) alarm. ● Show how to communicate with hand signals and coded sounds of horns. ● Demonstrate how to be cautious against hazards of machine in operation. ● Read the survey prints and layouts.

- Explain how to assist with other aspects of the operation such as mine services, long hole drill, loading/mucking, when required.
- List the precautions to be taken when handling explosives.
- Discuss about the refresher training as per fourth schedule MVTR (1966) within one month of joining duties following absence from duties for a period exceeding one year.
- Explain how to reduce downtime and wastages.
- Explain the importance and types of documentation in organization.
- Throw light on the risk and impact of not following defined procedures/work instructions/ company's SOP.
- Discuss the rules and regulations of mine as per standard operating procedure (SOP).
- Explain how to use use life line extended from the base as the team proceeds.
- State 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.
- Throw light on the locally prepared emergency response /disaster management plan.
- Discuss safety regulations ensuring safety of others.
- Explain about the basics of single/ double boom jumbo drilling rig, diesel engines, electric motors and compressors.
- Discuss about hard rock mining.
- Explain about the various levers and switches in order to operate the drill properly.
- Illustrate the drilling pattern and sequence of operations.
- Explain the different types of drill bits and their uses.

- List the common terminology vis-à-vis jumbo drillings.
- Explain the operation of different assemblies and sub-assemblies such as under- carriage, compressors, and hydraulic/pneumatic systems.
- Recall the safety devices fitted on compressors of drilling machine.
- State the correct sequence of operation of different levers.
- Discuss the transmissions of compressed air from compressor to drill head.
- Explain the importance of selection of proper rotation speed and effect of excessive speeds on the life of drill bits.
- State the specification of single/ double boom jumbo drilling rig used in mines.
- Recall about the instrument panel, various controls their location and operation.
- Discuss about the lubrication system of drills.
- Elucidate the importance of drill hole design and impact of poor drill hole design on blasting.
- Explain about fly rocks and air-blast.
- Explain inclined hole, azimuth, deviation, dip.
- Discuss about safety measures to be taken during drilling, marching and other operations.
- Recall the dangers from loose hose joints and defective hoses.
- Recall signage, mining area signs and other safety and emergency signals.
- Explain wet cutting, drilling method, drilling pattern.
- Describe dangers from cutting/ drilling in stone band.
- Discuss slope failures, joint spacing, caving.
- Explain fleeting of ore cutting machine on gradient.
- Discuss ground support plans.
- Discuss electrical and mechanical knowledge of jumbo rigs.

<ul style="list-style-type: none"> ● Explain dust extraction system and water injection system. ● Throw light on the Connection Flow Monitors. 	
Classroom Aids	
LCD Projector, Laptop/Computer with internet, White Board, Flip Chart, Markers	
Tools, Equipment and Other Requirements	
Single and/ double boom jumbo drilling rig, controls, gauges, warning lamp, crown blocks, Projector System, Drilling machine, steel tape 1 meter, direct reading vernier calliper, Hydraulic jack, jib crane, chisel bits / compressed air / couplings/ rods etc., controls, gauges, warning lamp, Diesel Engines, Electric Motors and compressors, battery charger, hammer, Signage, 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, Different types of logbook, SSR, EMP	

Module 4: Perform routine maintenance and troubleshooting on the jumbo drill machine

Mapped to MIN/N1210, v1.0

Terminal Outcomes:

- Demonstrate how to perform routine maintenance in accordance with the manufacturer’s recommendations and company procedures
- Perform the steps of basic diagnostics and troubleshooting

<i>Duration:30:00</i>	<i>Duration:40:00</i>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> ● Describe the different types of mines and detail of the mine a person is working in. ● Explain the process of tracking machine operating hours (drilling hours and engine hours) to assess the right service schedule. ● Discuss about mine organisation, time keeping, need for discipline and punctuality. ● Explain benching in quarries, dressing of overhangs, undercuts, fencing, first aid and hygiene. ● State the code of traffic in specific areas of mine and significance of fences. ● Discuss standing orders in force at the mine and shot-firing and safety regulations. ● Discuss about tramways and siding, haulage rooms, winding rooms, boilers, electrical gears. ● Throw light on the duties of workmen. ● Discuss the provision of wages, working hours and accident compensation as per Mines act. ● Summarize mining safety procedures and impact of violation of safety procedures. ● Recall the technical problems that may arise. ● Explain how to ensure the machine is on firm and level ground before attempting to carry out any maintenance activity. ● Throw light on how to ensure that no maintenance task on the engine is performed when running or still hot. ● Enlist the precautions to be taken when handling explosives. 	<ul style="list-style-type: none"> ● Show how to clean air filter dust bowls. ● Display how to clean footplates, pedals and steps from mud, dirt, ice and snow. ● Perform the steps to draining of water and sediment /fuel separators. ● Demonstrate how to replenish coolants, lubricants and fluids. ● Show how grease to all greasing pins and pivot points. ● Demonstrate how to check battery levels and condition of the terminals and carry out minor adjustments if required. ● Display how to check and maintain the tyre rims, air pressure, wheel nuts and treads. ● Apply appropriate techniques to check the structural safety of the machine. ● Demonstrate how to complete timely and legibly daily/weekly maintenance sheets. ● Display how to perform routine inspections on equipment. ● Perform the steps on how to ensure proper Lock out and Tag out scenario to avoid any untoward incident triggered due to unknowingly operation of machine / system under maintenance. ● Show how to complete timely and legibly defect sheets as provided by the company. ● Display how to prepare communication materials, manuals and other written materials related to technical issues, programs or systems.

- Discuss about refresher training as per first schedule, Mining Vocational Training Rules (MVTR) 1966. if absent from mines for a period of One year or more before re-employment.
- Describe types of documentation in organization e.g. daily maintenance checklist and importance of the same.
- Discuss the risk and impact of not following defined procedures/work instructions.
- Discuss the rules and regulations of mine as per standard operating procedure (SOP).
- Elucidate the risk and impact of not following company's SOP.
- State the escalation matrix for reporting identified problems.
- Discuss the importance of commitment to working safely while ensuring the safety of others.
- Discuss established policies, practices and procedures.
- Throw light on the operation of different assemblies and sub-assemblies such as under-carriage, compressors, hydraulic/pneumatic systems.
- State the specification and details of jumbo drills used in mines.
- Recall about the instrument panel, various controls their location and operation.
- Discuss the lubrication process of drills.
- Explain about the various levers and switches in order to operate the drill.
- Illustrate the drilling pattern and sequence of operations.
- Enlist the different types of drill bits and their uses.
- List the common terminology vis-à-vis drilling.
- Discuss the safety measures to be taken during drilling, marching and other operations.
- Recall the signage, mining area signs and other safety and emergency signals.

<ul style="list-style-type: none"> ● Explain wet cutting, drilling method, drilling pattern. ● Elucidate dangers from cutting/ drilling in stone band. ● Explain fleeting of ore cutting machine on gradient. ● Discuss the importance of keeping machinery reasonably free from dust. ● Discuss how to respond to emergencies such as fire, accident, major failure 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>Single and/ double boom jumbo drilling rig, controls, gauges, warning lamp, crown blocks, Projector System, Drilling machine, steel tape 1 meter, direct reading vernier calliper, Hydraulic jack, jib crane, chisel bits / compressed air / couplings/ rods etc., controls, gauges, warning lamp, Diesel Engines, Electric Motors and compressors, battery charger, hammer, Signage, 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, Different types of logbook, SSR, EMP, Drill bits, LOTO</p>	

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

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	<p>Prospective ES Master trainer should:</p> <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
<p>Certified in 60-hour Employability NOS (2022), with a minimum score of 90%.</p> <p>OR</p> <p>Certified in 120-, 90-hour Employability NOS (2022), with a minimum score of 90%</p>	<p>MEP/Q2602, v2.0 Master Trainer (VET and Skills). Minimum accepted score as per SSC guideline is 90%.</p>

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:

- 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).
- 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 coal mines

Mapped to MIN/N1704, v1.0

Terminal Outcomes:

- Discuss about the worksite health and safety measures and environmental guidelines.

<i>Duration:20:00</i>	<i>Duration:50:00</i>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> ● List the preventive measures against firedamp, white damp, blackdamp 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. 	<ul style="list-style-type: none"> ● 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, apparatus 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.

- Discuss the safety guidelines specified by Directorate General of Mine Safety (DGMS) and selection process of person 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 used in U/G mines.
- Enlist different types of supporting system used in U/G mines as per SSP and SSR.
- Cite precautions to be taken when handling heavy equipment.
- Discuss how to ensure that the roof and sidewalls of the mine face (or newly exposed area of the mines) have been scaled/ dressed properly.
- List relevant safety precautions to be taken during depillaring operation in UCM.
- Recall the safety precautions to be followed while traveling on U/G haul roads, in case of post blast fumes and misfire.
- Discuss the manufacturer's instructions for care and safe operation of mine machinery and equipment.
- Throw light on the laid out SOP in case of alarm signal for leakage of inflammable gases.
- Explain the process of reporting any unsafe act/condition in the working area to the concerned person.
- Discuss how to use underground mine communication system.
- Elucidate 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 Creche Rules, 1966 (MCR) for any females employed in the mines.
- Discuss about basic safety regulations of Coal Mines Regulation, 2017 (CMR).
- List types of stone dust barrier and its importance.
- Explain coal dust explosion and its preventive measures.
- 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.

<ul style="list-style-type: none"> • Throw light on importance of water/material/energy conservation and management. 	
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, 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 metal mines

Mapped to MIN/N1702, v1.0

Terminal Outcomes:

- Discuss about the worksite health and safety measures, and environmental guidelines

<i>Duration: 20:00</i>	<i>Duration: 50:00</i>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> ● Explain how to undertake "The Take-5 (Personal Risk Assessment)" before commencement of any work (DGMS Tech. circulars 2/2014). ● Discuss how to comply with safety, health and security-related regulations/guidelines at the mine 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 	<ul style="list-style-type: none"> ● 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.

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.
- 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 work place 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, gum boots, ear plugs, 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 Creche Rules, 1966 (MCR) for females employed in the mines.
- Discuss the importance of sensitization towards different genders and persons with disabilities. (PWD).
- Explain the importance of following infection control policies, '5-S' practices, and waste management.
- Discuss the importance of water/material/energy conservation and management.
- Discuss Safety Management Plan (SMP) and Emergency Management Plan (EMP)

<ul style="list-style-type: none"> ● 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. 	
<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 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>	

Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training Experience		Remarks
		Years	Specialization	Years	Specialization	
Class X	NA	6	Relevant experience required in Jumbo Drill Operations	NA	-	-
OR						
ITI	Mechanical Engineering	6	Relevant experience required in Jumbo Drill Operations	NA	-	-
OR						
Diploma	Mechanical Engineering	5	Relevant experience required in Jumbo Drill Operations	NA	-	-
OR						
B-Tech	Mechanical Engineering	4	Relevant experience required in Jumbo Drill Operations	NA	-	-
OR						
CITS-NCIC	Machinist & Operator, Advance Machine Tool	1	Relevant experience in mining	NA	-	-

Trainer Certification	
Domain Certification	Platform Certification
MIN/Q 1203 V3.0, Jumbo Drill 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 in Jumbo Drill Operations	NA	-	-
OR						
ITI	Mechanical Engineering	8	Relevant experience required in Jumbo Drill Operations	NA	-	-
OR						
Diploma	Mechanical Engineering	7	Relevant experience required in Jumbo Drill Operations	NA	-	-
OR						
B-Tech	Mechanical Engineering	6	Relevant experience required in Jumbo Drill Operations	NA	-	-
OR						
CITS-NCIC	Machinist & Operator, Advance Machine Tool	1	Relevant experience in mining	NA	-	-

Assessor Certification	
Domain Certification	Platform Certification
MIN/Q 1203 V3.0, Jumbo Drill 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 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
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