Model Curriculum

QP Name: Mineral Processing Operator
Options: Grinding, Mineral Recovery & Tailing Management

QP Code: MIN/Q4101

QP Version: 2.0

NSQF Level: 4

Model Curriculum Version: 2.0

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Training Parameters

Sector	Mining
Sub-Sector	Mineral Beneficiation
Occupation	Ore Processing
Country	India
NSQF Level	4
Aligned to NCO/ISCO/ISIC Code	NCO-2015/8112.9900
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. Mineral Processing 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	2.0
Model Curriculum Creation Date	27/01/2022
Model Curriculum Valid Up to Date	27/01/2025
Model Curriculum Version	2.0
Minimum Duration of the Course	450 hours
Maximum Duration of the Course	510 hours

Program Overview

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

Training Outcomes

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

- Perform the steps on how to conduct pre-operation checks of crusher and crusher sites
- Demonstrate how to operate the feeders and conveyors
- Show how to operate and maintain the crusher
- Discuss worksite health, safety and environmental guidelines for opencast mines
- Display how to perform grinding of crushed ore/mineral
- Explain about the beneficiation and mineral recovery
- Show how to manage tailings

Compulsory Modules

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

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
Bridge Module	**10:00**	**00:00**	**00:00**	**-**	**10:00**
Module-1 Introduction to the Job Role of Mineral Processing Operator	10:00	00:00	00:00	-	10:00
MIN/N4101- Pre-Operation checks of crusher and crusher sites **NOS Version No. 1.0** **NSQF Level- 4**	**20:00**	**30:00**	**60:00**	**-**	**110:00**
Module-2 Pre-Operation checks of crusher and crusher sites	20:00	30:00	60:00	-	110:00
MIN/N4102- Operate conveyors and feeders NOS Version No.1.0 **NSQF Level - 4**	**20:00**	**30:00**	**40:00**	**-**	**90:00**

Module-3 Operate conveyors and feeders	20:00	30:00	40:00	-	90:00
MIN/N4103 - Operation and maintenance of the crusher **NOS Version No. 1.0** **NSQF Level – 4**	**20:00**	**30:00**	**40:00**	**-**	**90:00**
Module-4 Operation and maintenance of the crusher	20:00	30:00	40:00	-	90:00
MIN/N1703- Follow Health, Safety, and Environmental Guidelines for opencast mines (Including Mine Vocational Training Rule) *NOS Version No. 1.0* **NSQF Level – 4**	**20:00**	**30:00**	**40:00**	**-**	**90:00**
Module-5 Follow Health, Safety, and Environmental Guidelines for opencast mines	20:00	30:00	40:00	-	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	**114:00**	**156:00**	**180:00**	**-**	**450:00**

Optional Modules:

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

Option 1: Grinding

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
MIN/N4104- Grinding of crushed Ore/mineral ***NOS Version No. 1.0*** **NSQF Level – 4**	**20:00**	**20:00**	**20:00**	**-**	**60:00**
Module-6: Grinding of crushed Ore/mineral	20:00	20:00	20:00	-	60:00
Total Duration	**20:00**	**20:00**	**20:00**	**-**	**60:00**

Option 2: Beneficiation

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
MIN/N4105- Beneficiation and Mineral recovery ***NOS Version No. 1.0*** **NSQF Level – 4**	**20:00**	**20:00**	**20:00**	**-**	**60:00**
Module-7: Beneficiation andMineral recovery	20:00	20:00	20:00	-	60:00
Total Duration	**20:00**	**20:00**	**20:00**	**-**	**60:00**

Option 3: Tailing

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
MIN/N4106- Tailing Management ***NOS Version No. 1.0*** **NSQF Level – 4**	**20:00**	**20:00**	**20:00**	**-**	**60:00**
Module 8: Tailing Management	20:00	20:00	20:00	-	60:00
Total Duration	**20:00**	**20:00**	**20:00**	**-**	**60:00**

Module Details

Module 1: Introduction to the Job Role of Mineral Processing Operator

Bridge Module

Terminal Outcomes:

- Discuss the scope of a Mineral Processing Operator.
- Throw light on the role and responsibilities of a Mineral Processing Operator

Duration:*10:00*	**Duration**:*00:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe the job role & responsibilities of Mineral Processing operator. • Explain the concepts of Mineral processing. • Discuss the overall steps and processes of mineral processing. • Discuss Regulatory context specific to Mines and Mineral Processing Plant.	
Classroom Aids	
LCD Projector, Laptop/Computer with internet, White Board, Flip Chart, Markers	
Tools, Equipment and Other Requirements	
Posters describing different types of Mineral Processing plants and associated operations	

Module 2: Pre-Operation checks of crusher and crusher sites

Mapped to MIN/N4101, v1.0

Terminal Outcomes:

- Demonstrate how to conduct pre-operation checks of crusher and crusher sites

Duration:*20:00*	**Duration**:*30:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Throw light on the job-specific documents e.g. daily maintenance checklist and importance of the same. • Discuss the risk and impact of not following defined procedures/work instructions. • State the hierarchy for reporting identified problems. • Discuss the impact of delays in the process and damage of equipment to the company. • List the different types of mines and detail of the mine one is working in. • Discuss benching in quarries, dressing of overhangs, undercuts, fencing. • Outline the importance of first aid and hygiene. • State the code of practice in specific areas of the mine. • Discuss the standing orders in force at the mine. • Recall components of belt conveyor system including its principal components like, trough, conveyor belt, clips, roller, guards, tensioners, feed and discharge chutes, head, tail and take-up pulleys, bearings, controls such as switches, trip cords, Inter locks, alarms, etc. • Enlist corrective actions against any safety hazards. • Explain the importance of safety measures in the vicinity of machinery. • Explain the shot-firing / blasting related safety regulations including taking shelter during blasting. • List corrective actions on any unusual issues observed during operational checks. • Discuss the duties of workmen, provision of compensation and working hours, leaves, etc under the Mines Act-1952. • Throw light on the outcome of violation of safety procedures. • Outline the emergency response /disaster	• Display how to check the electric panel and electric supply before starting the crusher. • Perform the steps on how to check the availability of raw materials at the site. • Demonstrate how to inspect the moveable parts in crushers like conveyor belts, rollers, stringers, etc. for wear and tear. • Show how to check the Vertical Shaft Impactor (VSI) crusher, tips, liners, etc. • Role-play the situation on how to coordinate with other vehicle operators for procurement of the raw material as per standards of the organisation. • Apply appropriate techniques to inspect the suitable fire extinguishers and automatically operated fire suppression system and devices including automatic fire detection system at site. • Read the layout of belt conveyor system. • Prepare the mechanical and electrical driving units including the safety devices. • Demonstrate how to conduct conveying of the ore to the processing unit considering parameters like feed/ material rate, alignment of conveyor belts, spillage amount and rate, conveyor jams etc. • Perform the steps on how to conduct operational checks on areas of potential issues like unusual noises/ smells, blockages and obstruction, lubrication of drive head, tail end and rollers, leaks, ensure magnets are operative. • Apply appropriate techniques to check the principal components of hoppers and bins, like grizzly rails, chutes, guardrails etc.

management plan prepared by the organization. • List the different types of processes and equipment associated with ore processing. • Describe the mechanism of transmission of power. • List the types of raw materials and its physical qualities. • Explain the basic electrical functioning and repairs. • Explain about Vertical Shaft Impactor (VSI) crusher, tips, liners, etc. • List the various moveable part of crusher such as conveyor belts, rollers, stringers, etc.	
Classroom Aids	
LCD Projector, Laptop/Computer with internet, White Board, Flip Chart, Markers	
Tools, Equipment and Other Requirements	
Screw, Trough, Scrapers, Conveyor belt, clips, Roller chains, Guards, Tensioners, Feed and Discharge Chutes, Head, Tail and take-up pulleys, Bearings, brakes, controls such as switches, trip cords, Inter locks, alarms, electrical driving units including safety device, Audio Visual Alarm, Pumps, Hand and power tools, pneumatically and hydraulic power tools, scaffolds, ladder, Various types of reagents (acids, carbon, cyanide, calcium).	

Module 3: Operate conveyors and feeders

Mapped to MIN/N4102, v1.0

Terminal Outcomes:

- Demonstrate how to operate the feeders and conveyors

Duration:*20:00*	**Duration**:*30:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss the job-specific documents e.g. daily maintenance checklist and importance of the same. • Throw light on the risk and impact of not following defined procedures/work instructions. • State the hierarchy for reporting identified problems. • List the corrective actions to be taken against any safety hazards like spillage etc. and issues like unusual noises/ smells, blockages and obstruction, lubrication, leaks, etc. • Discuss the impact of delays in the process and damage of equipment to the company. • Outline the safe code of practice for erection, installation, operation, repairs, maintenance, dismantling of plant and ancillary equipment and for the prevention of accident and to provide safety, health, convenience and discipline of the workers. • Discuss the safety guidelines specified by Directorate General of Mines Safety (DGMS) specific to mineral processing operations. • List the different types of mines and detail of the mine one is working in. • Discuss benching in quarries, dressing of overhangs, undercuts, fencing. • Throw light on the ways to take corrective actions against any safety hazards. • Explain the importance of first aid and hygiene. • State the code of practice in specific areas of the mine. • Discuss how to ensure the principal components of hoppers and bins, like grizzly rails, chutes, guardrails, etc. are deployed to control stockpile levels,	• Read the layout and recall the components of feeders including chains, pans, bearings, rollers, shafts, feed/discharge chute, drive mechanisms, lubrication systems, controls, drive belts, hangers/cables, etc. • Demonstrate how to conduct feeding of the ore to the crusher considering parameters like feed/ material rate, tilt, jams etc. • Perform the steps on how to check the suitable fire extinguishers and automatically operated fire suppression system and devices including fire detection system. • Demonstrate the ways to interpret the layout and recognize the components of a belt conveyor system including its principal components like trough, conveyor belt, clips, roller, guards, tensioners, feed and discharge chutes, head, tail and take-up pulleys, bearings, controls such as switches, trip cords, Interlocks, alarms, etc. and operations of mechanical and electrical driving units including safety devices. • Demonstrate conveying of the ore to the processing unit considering parameters like feed/ material rate, alignment of conveyor belts, spillage amount and rate, conveyor jams etc. • Show how to perform the operational checks on areas of potential issues like unusual noises/ smells, blockages and obstruction, lubrication of drive head, tail end and rollers, leaks, ensure magnets are operative and take corrective actions if required.

stability of stockpiles, clearing of the obstruction, etc. • Discuss the standing orders in force at the mine and the importance of safety in the vicinity of machinery. • Discuss the shot-firing / blasting related safety regulations including taking shelter during blasting. • Throw light on the duties of workmen, provision of compensation and working hours, leaves, etc. under the Mines Act-1952. • State the outcome of violation of safety procedures. • Discuss the emergency response /disaster management plan prepared by the organization. • List the different types of processes and equipment associated with mineral processing. • Describe the mechanism of transmission of power. • Explain the use of proper signals and their correct interpretation. • Describe the usage of warning bells and application of safety devices. • Explain the operation of different levers and operating switches and loading of mineral. • List the different types of conveyors. • Enlist the various principal components of conveyors. • List the different types of principal components of hoppers and bins. • Enlist the different types of feeders. • List the various principal components of feeders. • Discuss various specific safety features of conveyor systems (pull chord, label switch, fire alarm etc.) • Explain the usage of hand drills, guards etc. • Discuss the belt mechanisms/systems (belt fastening, belt jointing etc.) • Throw light on the hazards and safety aspects involved in ore processing activities, and usage of relevant PPEs.	
Classroom Aids	
LCD Projector, Laptop/Computer with internet, White Board, Flip Chart, Markers	
Tools, Equipment and Other Requirements	
Screw, Trough, Scrapers, Conveyor belt, clips, Roller chains, Guards, Tensioners, Feed and	

Discharge Chutes, Head, Tail and take-up pulleys, Bearings, brakes, controls such as switches, trip cords, Inter locks, alarms, electrical driving units including safety device, Audio Visual Alarm, Pumps, Hand and power tools, pneumatically and hydraulic power tools, scaffolds, ladder, Various types of reagents (acids, carbon, cyanide, calcium).

Module 4: Operation and maintenance of the crusher

Mapped to MIN/N4103, v1.0

Terminal Outcomes:

- Demonstrate how to operate the crusher and the crushing screen
- Show how to conduct the maintenance and troubleshooting of the crusher

Duration:*20:00*	**Duration**: *30:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Discuss the job-specific documents e.g. daily maintenance checklist and importance of the same. • Throw light on the risk and impact of not following defined procedures/work instructions. • State the hierarchy for reporting identified problems. • Recall the important components of a jaw crusher, cone crusher, etc. • Discuss the impact of delays in the process and damage of equipment to the company. • Recall the ways to identify the components towards crushing of the material like drive mechanism, pulleys, crushers, etc. • Throw light on the safety guidelines specified by Directorate General of Mines Safety (DGMS) specific to mineral processing operations. • List the different types of mines and detail of the mine one is working in. • Discuss benching in quarries, dressing of overhangs, undercuts, fencing. • Recall the signals from assistant to start or stop the equipment. • Explain the importance of first aid and hygiene. • State the code of practice in specific areas of the mine. • Throw light on the standing orders in force at the mine, importance of safety in the vicinity of machinery and shot-firing / blasting related safety regulations including taking shelter during blasting. • Outline the duties of workmen, provision of compensation and working hours, leaves, etc. under the Mines Act-1952.	• Demonstrate how to start and stop of the crusher appropriately. • Show the use of various types of crusher and their crushing principle. • Display ways of comminution. • Show how to check different principal components of crusher, such as gates, chutes and gaps, feeder, conveyor, dust collectors, water sprays, etc. • Demonstrate how to conduct crushing operations by controlling the feed/material by adjusting opening of gates, chutes and gaps, adjusting speed of feeder, adjusting speed of conveyor, controlling dust by using dust collectors, water sprays, remove and clean excess spillage, etc. • Demonstrate checking the continuity of flow, safety, and efficient operation as per the instructions. • Perform the steps on how to check for proper graded flow of materials into the crushers and control the speed and flow of material through conveyors. • Apply appropriate techniques to test samples of materials or products to ensure compliance with specification as per Indian standard(IS). • Perform operational checks on areas of potential issues like unusual noises/ smells, blockages and obstruction, leaks etc. and take corrective actions if required. • Demonstrate how to identify the areas of blockage and clear them periodically. • Role-play the situation on how to coordinate with the vehicle operators for collection of the output as per instructions from them, keeping safety in mine. • Perform operational checks on areas of potential issues like unusual noises/ smells,

• Recall the process requirement for separating feed/material and working around screens, including reporting, control of dust, load limitations, control of feed/material flow rate etc. • State the outcome of violation of safety procedures. • Discuss the emergency response /disaster management plan prepared by the organization. • State the different types of crusher and their importance. • Throw light on how to check the indicators that signal need for replacement. • List the various principal components of crusher, such as gates, chutes and gaps, feeder, conveyor, dust collectors, water sprays etc. • Enlist the different types of screening equipment like drive mechanism, balance wheel, rocker arms, conveyor belts, guards, etc. • Recall the hazards and safety aspects involved in ore processing activities and usage of relevant PPEs.	blockages and obstruction, leaks etc. • Demonstrate how to replace crusher component/wear part as per requirement or schedule. • Perform the steps on how to replenish the coolants, lubricants, fluids and screeners as and when required. • Display the safe code of practice for erection, installation, operation, repairs, maintenance, dismantling of plant and ancillary equipment and for the prevention of accident and to provide safety, health, convenience and discipline of the persons so employed. • Demonstrate how to identify missing or defective components or controls and replace them with genuine OEM recommended components. • Perform the steps on how to check oil, fuel tanks for leaks and take necessary actions as per the operational manual. • Show how to lubricate all the moving parts at regular intervals.
Classroom Aids	
LCD Projector, Laptop/Computer with internet, White Board, Flip Chart, Markers	
Tools, Equipment and Other Requirements	
Screw, Trough, Scrapers, Conveyor belt, clips, Roller chains, Guards, Tensioners, Feed and Discharge Chutes, Head, Tail and take-up pulleys, Bearings, brakes, controls such as switches, trip cords, Inter locks, alarms, electrical driving units including safety device, Audio Visual Alarm, Pumps, Hand and power tools, pneumatically and hydraulic power tools, scaffolds, ladder, Various types of reagents (acids, carbon, cyanide, calcium).	

Module 5: Follow Health, Safety, and Environmental Guidelines for opencast mines (Including Mine Vocational Training Rule)

Mapped to MIN/N1703, v1.0

Terminal Outcomes:

- Discuss worksite health and safety measures and environmental guidelines.

Duration:*20:00*	**Duration**:*30:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain how to comply with safety, health, and security-related regulations/guidelines at the open cast mine and safety instructions given by the workman's inspector. • Describe about various environmental awareness program related to mining, organized by the various government bodies/ company. • Discuss how to follow adequate safety while working at haul roads, heights, overburden dumps, sump area, stockyard, near moving parts, etc. • Recall the safety precautions to be taken while working on sites (sub-station, workshop etc.), with equipment, and conducting welding and cutting operations. • Discuss how to follow appropriate Safe Operating Procedure (SOP) while dealing with explosives. • Illustrate how to respond promptly and appropriately to an accident/ incident or an emergency situation, within limits of the role and responsibility. • Discuss usage of appropriate PPE as per the requirement. • Explain how to maintain hand hygiene by washing hands with alcohol based sanitisers/soap. • Elucidate on how to maintain hygiene at the work site and disinfect the machine/tools before and after work/task. • State how to report any symptoms of illness to the shift-in-charge. • Discuss the safety guidelines specified by Directorate General of Mine Safety (DGMS). • List basic mining terminologies and	• Show how to provide first aid to an injured person. • Display how to operate various types of fire extinguishers to control different types of fire at a worksite when required. • Role-play the situations on how to assist supervisor for reducing environmental impact caused due to related mining operations.

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

system of the mines. • State the mine safety standard including illumination level, noise levels, dust level, pollutants, etc. at the work-site. • List the common sources of pollution in the mines and ways to minimize it. • Enlist the safety equipment 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. • Discuss emergency response /disaster management plan prepared by the organization.	
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); Alcohol based sanitizers; self-rescue apparatus; Gas Detector, gum boots; Diagrams of Armoured face conveyor; Charts of occupational diseases; CMR; MMR; MRR, Company's Safety Management Plan (SMP) and Emergency Management Plan (EMP)	

Employability Skills (60 Hours)

Mapped to DGT/VSQ/N0102, v1.0

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

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

Trainer Requirements

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

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

Master Trainer Requirements

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

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

Assessment Strategy

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

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

Proposed Assessment Strategy/Guidelines:

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

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

Module 6: Grinding of crushed Ore/mineral

Mapped to MIN/N4104, v1.0

Terminal Outcomes:

- Demonstrate how to operate the grind mill

Duration:*20:00*	**Duration**:*20:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe the job-specific documents e.g. daily maintenance checklist and importance of the same. • Discuss the risk and impact of not following defined procedures/work instructions. • State the hierarchy for reporting identified problems. • Discuss the impact of damaged equipment on the company. • Throw light on the implications of delays in the process. • Discuss the handover and takeover procedures of the mineral processing operations according to company's SOP. • Explain the safety guidelines specified by Directorate General of Mines Safety (DGMS) specific to mineral processing operations. • Enlist the different types of mines and detail of the mine one is working in. • Discuss benching in quarries, dressing of overhangs, undercuts, fencing. • Explain the importance of first aid and hygiene. • State the code of practice in specific areas of the mine. • Discuss the standing orders in force at the mine. • Explain the importance of safety in the vicinity of machinery. • Explain the shot-firing / blasting related safety regulations including taking shelter during blasting. • Discuss the duties of workmen and the provision of compensation and working hours, leaves, etc under the Mines Act-1952. • Explain the outcome of violation of safety procedures. • Discuss the emergency response /disaster management plan prepared by the	• Read the layout and recall components of grinding mills including its principal components. • Display how to conduct the grinding/ classifier operations considering parameters like load limitations, charging grinding media as required, control of dust, control of feed/material flow rate, control and maintenance of densities, sampling and testing, proper grind, reagent addition etc. • Display how to ensure that the control switches are operative and free of obstructions. • Demonstrate how to ensure that the lubrication system(s) are functioning properly. • Apply suitable techniques to ensure that the cooling system(s) are operative. • Perform the steps to ensure that the feed and discharge points are free of obstructions and blockages. • Demonstrate how to guard against all identified hazards using rope/ bafflers and/or signs, clean up spills and leaks, etc. • Perform the steps to inspect classifier and components, such as feed gate, discharge point, trash screen, guards, cyclone, feed lines, launders, skirting, upstream and downstream equipment and related systems, rollers, Spirals. • Demonstrate how to ensure the wearing of fall arrest system, control required quantity /quality of discharge by sampling and testing as required, adjusting water flow, adjusting feed rate, control dust by using: dust collectors, water sprays, ensure minimum spillage, etc. • Demonstrate how to control density (in terms of percent solid, Specific Gravity) by sampling. • Perform the steps to conduct operational

organization. • List the different types of processes and equipment associated with mineral processing. • Recall the safety features for conveyor systems (pull chord, label switch, fire alarm etc.). • List the different types of mills include: ball mill, pebble mill, autogenous mill/scrubber, semi- autogenous mill, rod mill, regrind mill. • List the different components of mills. • Throw light on the use of hand drills, guards etc. • Explain the belt mechanisms/systems (belt fastening, belt jointing etc.) • Discuss the hazards and safety aspects involved in ore processing activities, and usage of relevant PPEs.	checks on areas of potential issues like unusual noises/ smells, blockages and obstruction; Take corrective actions.
Classroom Aids	
LCD Projector, Laptop/Computer with internet, White Board, Flip Chart, Markers	
Tools, Equipment and Other Requirements	
Screw, Trough, Scrapers, Conveyor belt, clips, Roller chains, Guards, Tensioners, Feed and Discharge Chutes, Head, Tail and take-up pulleys, Bearings, brakes, controls such as switches, trip cords, Inter locks, alarms, electrical driving units including safety device, Audio Visual Alarm, Pumps, Hand and power tools, pneumatically and hydraulic power tools, scaffolds, ladder, Various types of reagents (acids, carbon, cyanide, calcium).	

Module 7: Beneficiation and Mineral recovery

Mapped to MIN/N4105, v1.0

Terminal Outcomes:

- Recall the right beneficiation processing requirements and related parameters
- Demonstrate how to conduct leaching, separation, floatation, dewatering and filtration

Duration:*20:00*	**Duration**:*20:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Recall the beneficiation processing methodology and discuss process manuals/ work instructions/standard operating procedures, SOP. • Describe the job-specific documents e.g. daily maintenance checklist and importance of the same. • Discuss the risk and impact of not following defined procedures/work instructions. • State the hierarchy for reporting identified problems. • Discuss the impact of delays in the process and damage of equipment to the company. • Explain the safety guidelines specified by Directorate General of Mines Safety (DGMS) specific to mineral processing operations. • List the different types of mines and detail of the mine one is working in. • Discuss benching in quarries, dressing of overhangs, undercuts, fencing. • Explain the importance of first aid and hygiene. • State the code of practice in specific areas of the mine. • Discuss the standing orders in force at the mine. • Explain the importance of safety in the vicinity of machinery. • Explain how to guard against all identified hazards using rope/barriers and/or signs, clean up spills and leaks, report condition to appropriate personnel. • Explain the shot-firing / blasting related safety regulations including taking shelter during blasting. • Explain the duties of workmen and the provision of compensation and working hours, leaves, etc. under the Mines Act-	• Demonstrate how to use required quantity of effective reagents and handle reagents correctly. • Show how to monitor the reagent addition rate and mix continuously. • Demonstrate how to use various tools used at different steps of ore processing like hand & power tools, pneumatically & hydraulically powered tools, scaffolds, ladders etc. • Show how to perform the operations of various equipment used at various stages like mobile equipment and lifting equipment. • Demonstrate the operating of the various tools & equipment with the effective equipment handling guidelines. • Show how to prepare for the emergency situations with required instructions and equipment in place. • Demonstrate how to conduct checks on various operational parameters like tank level, pH level, reagent usage, air parameters, alarms, pumps, screens, monitors, etc. • Apply suitable techniques to add reagents as required, such as acids, carbon, cyanide, calcium as per the process requirements. • Demonstrate how to conduct leaching to extract the minerals from the grinded ores. • Show how to check and monitor threshold limit values (TLVs). • Perform the steps to check various separation systems like drive system, drums, concentrators, jigs, classifiers etc. • Apply suitable techniques to check various operating parameters like operating levels, pressures, cleanliness. • Perform checking and monitoring of threshold limit values (tlvs).

1952. • Describe how to ensure the maintenance of flow rate. • Throw light on the outcome of violation of safety procedures. • Discuss the emergency response /disaster management plan prepared by the organization. • List the different types of processes and equipment associated with mineral processing. • Recall the different components of floatation system including floatation air, bank of cells, conditioner, collector, floatation column, cells, such as: roughers, scavenger, cleaners, pumping system in-line assay system. • Describe the various separation systems like drive system, drums, concentrators, jigs, classifiers etc. • Enlist the reagents such as acids, carbon, cyanide, calcium as per the process requirements. • List the different types of floatation equipment and their components including floatation air, bank of cells, conditioner, collector, floatation column, cells, such as: roughers, scavenger, cleaners, pumping system, in-line assay system, scrubbers etc. • List the different types of dewatering systems include: stock tanks, decanters, pumping systems, sampling systems, rakes, drive system, feed wells. • Discuss how to ensure proper amount, type and strength of reagents to be used. • List the equipment like shell, rakes (e.g. height, integrity), motor and gear box for unusual noises, U/F pumps, etc. • Demonstrate different types of dewatering systems. • Describe the vacuum system, gear box, bearings, PLC, RLC operation (Logic controls), Pump, hydraulic systems, motors, valves etc. • Discuss the hazards and safety aspects involved in ore processing activities and usage of relevant PPEs. • Recall the different types of filtration systems and their components. • Throw light on how to monitor boot levels	• Demonstrate guarding all identified hazards using rope/barriers and/or signs, clean up spills and leaks, report condition to appropriate personnel. • Demonstrate how to start the floatation system and ensure adequate flow. • Demonstrate how to control the quantity of reagents, percent solid, addition of air, level of froth/pulp, launder water, pump speed, pH level. • Display how to stop the floatation circuit in sequence. • Show how to operate and maintain dewatering system while checking the shell, rakes (e.g. height, integrity), motor and gear box for unusual noises, pumps, water supply, pumps and valves etc. • Show how to guard all identified hazards using rope/barriers and/or signs, clean up spills and leaks, report condition to appropriate personnel. • Perform the steps to check the functioning of vacuum system, gear box, bearings etc. • Show how to check the condition of the filter (e.g. thickness of filter cake). • Demonstrate how to conduct filtration while controlling the moisture, filtrate, wash water, pump speed, pressure, density etc.

and agitation.	
Classroom Aids	
LCD Projector, Laptop/Computer with internet, White Board, Flip Chart, Markers	
Tools, Equipment and Other Requirements	
Screw, Trough, Scrapers, Conveyor belt, clips, Roller chains, Guards, Tensioners, Feed and Discharge Chutes, Head, Tail and take-up pulleys, Bearings, brakes, controls such as switches, trip cords, Inter locks, alarms, electrical driving units including safety device, Audio Visual Alarm, Pumps, Hand and power tools, pneumatically and hydraulic power tools, scaffolds, ladder, Various types of reagents (acids, carbon, cyanide, calcium).	

Module 8: Tailing Management

Mapped to MIN/N 4106, v1.0

Terminal Outcomes:

- Demonstrate how to treat the water
- Show how to manage the tailings

Duration:*20:00*	**Duration**:*20:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe the job-specific documents e.g. daily maintenance checklist and importance of the same. • Discuss the risk and impact of not following defined procedures/work instructions. • State the hierarchy for reporting identified problems. • Discuss the implications of delays in the process and the impact of damaged equipment on the company. • Explain the safety guidelines specified by Directorate General of Mines Safety (DGMS) specific to mineral processing operations. • List the different types of mines and detail of the mine one is working in. • Discuss benching in quarries, dressing of overhangs, undercuts, fencing. • Outline the importance of first aid and hygiene. • Throw light on the code of practice in specific areas of the mine. • Discuss the standing orders in force at the mine. • Explain the importance of safety in the vicinity of machinery. • Describe the shot-firing / blasting related safety regulations including taking shelter during blasting. • Discuss the duties of workmen and the provision of compensation and working hours, leaves, etc. under the Mines Act-1952. • Highlight the outcome of violation of safety procedures • Discuss the emergency response /disaster management plan prepared by the organization. • Recall the hazards and safety aspects involved in ore processing activities and usage of relevant PPEs. • Enlist the different types of processes and equipment associated with ore processing. • List the various water purifying agents and	• Demonstrate how to obtain water from the mineral recovery unit and send the same to the treatment area. • Display how to treat water with chemicals and purify the same to make it fit for reclamation purposes. • Show how to send water to reclamation area (settling ponds). • Show how to sample water and monitor levels of ponds. • Display how to treat the tailings to reduce the toxin levels. • Demonstrate how to check the pH level. • Display how to dispose tailings to the appropriate area.

waste treatment agents. • Summarize the hazards and safety aspects involved in ore processing activities and usage of relevant PPEs.	
Classroom Aids	
LCD Projector, Laptop/Computer with internet, White Board, Flip Chart, Markers	
Tools, Equipment and Other Requirements	
Screw, Trough, Scrapers, Conveyor belt, clips, Roller chains, Guards, Tensioners, Feed and Discharge Chutes, Head, Tail and take-up pulleys, Bearings, brakes, controls such as switches, trip cords, Inter locks, alarms, electrical driving units including safety device, Audio Visual Alarm, Pumps, Hand and power tools, pneumatically and hydraulic power tools, scaffolds, ladder, Various types of reagents (acids, carbon, cyanide, calcium).	

Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
Class 10th	NA	6	Relevant experience required in Mineral Processing Operation	NA	-	-
OR						
ITI	Mechanical/ Electrical/ Chemical/ Engineering	6	Relevant experience required in Mineral Processing Operation	NA	-	-
OR						
Diploma	Chemical/ Mineral Engineering	5	Relevant experience required in Mineral Processing Operation	NA	-	-
			OR			
B. Tech	Chemical/ Mineral Engineering	4	Relevant experience required in Mineral Processing Operation	NA	-	-
OR						
CITS-NCIC	Chemical Plant Technology	1	Relevant experience in Mineral Processing Operation	NA	-	-

Trainer Certification	
Domain Certification	**Platform Certification**
MIN/Q4101, v2.0 Mineral Processing 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 10th	NA	8	Relevant experience required in Mineral Processing Operation	NA	-	-
OR						
ITI	Mechanical/ Electrical/ Chemical Engineering	8	Relevant experience required in Mineral Processing Operation	NA	-	-
OR						
Diploma	Chemical/ Mineral Engineering	7	Relevant experience required in Mineral Processing Operation	NA	-	-
			OR			
B. Tech.	Chemical/ Mineral Engineering	6	Relevant experience required in Mineral Processing Operation	NA	-	-
OR						
CITS-NCIC	Chemical Plant Technology	1	Relevant experience in Mineral Processing Operation	NA	-	-

Assessor Certification	
Domain Certification	**Platform Certification**
MIN/Q4101, v2.0 Mineral Processing Operator. Minimum accepted score as per SSC guideline is 80%.	MEP/Q2701, v2.0 Assessor (VET and Skills). Minimum accepted score as per SSC guideline is 80%.

Assessment Strategy

Assessment system Overview:-

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

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

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

Testing Environment: -

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

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

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

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

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

Assessment Quality Assurance framework

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

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

Methods of Validation:-

Unless the trainee is registered, the person cannot undergo assessment. To further ensure that the person registered is the person appearing for assessment, id verification will be carried out.

Aadhar card number is required of registering the candidate for training. This will form the basis of further verification during the assessment. Assessor conducts the assessment in accordance with the assessment guidelines and question bank as per the job role. The assessor carries tablet with the loaded questions. This tablet is geotagged and so it is monitored to check their arrival and completion of assessment. Video of the practical session is prepared and submitted to SCMS. Random spot checks/audit is conducted by SCMS assigned persons to check the quality of assessment. Assessment agency will be responsible to put details in SIP.

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

Method of assessment documentation and access

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

References

Glossary

Term	Description
Declarative Knowledge	Declarative knowledge refers to facts, concepts and principles that need to be known and/or understood in order to accomplish a task or to solve a problem.
Key Learning Outcome	Key learning outcome is the statement of what a learner needs to know, understand and be able to do in order to achieve the terminal outcomes. A set of key learning outcomes will make up the training outcomes. Training outcome is specified in terms of knowledge, understanding (theory) and skills (practical application).
OJT (M)	On-the-job training (Mandatory); trainees are mandated to complete specified hours of training on site
OJT (R)	On-the-job training (Recommended); trainees are recommended the specified hours of training on site
Procedural Knowledge	Procedural knowledge addresses how to do something, or how to perform a task. It is the ability to work, or produce a tangible work output by applying cognitive, affective or psychomotor skills.
Training Outcome	Training outcome is a statement of what a learner will know, understand and be able to do upon the completion of the training.
Terminal Outcome	Terminal outcome is a statement of what a learner will know, understand and be able to do upon the completion of a module. A set of terminal outcomes help to achieve the training outcome.

Acronyms and Abbreviations

Term	Description
NSQF	National Skills Qualification Framework
NSQC	National Skills Qualification Committee
NOS	National Occupational Standards
RE	Rare Earths
SIP	Skill India Portal
SOP	Standard Operating Procedure
SCMS	Skill Council for Mining Sector