



National Vocational Certificate Level 4 in Mining Process Technology (Senior Technician/Shot Firer)



**National Vocational Certificate Level 4 in Mining Process Technology”
(Senior Technician/Shot Firer)**



(Curriculum)

National Vocational and Technical Training Commission (NAVTTTC) Government of Pakistan



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Introduction

Mining sector is one of the booming industries of Pakistan. There is an increasing demand of the Senior technician/shotfirer. Therefore, the skills are required to be inducted in the future generation. If an individual is planning to pursue a career in mining, this program will be helpful in targeting various commercial and non-commercial projects etc. If an individual is planning to take up Senior technician/shotfirer course, this course will help him weigh their choices better.

Keeping in view of the above the competency based national vocational qualifications have been developed by NAVTTC to train the unskilled human resource on the technical and entrepreneurial skills to be employed / self-employed and inevitably set sustainable impact on their lives by increasing their livelihood income.

Training Course is based on competency standards which are defined by the industry and the traditional role of a trainer changes and shifts towards the facilitation of training. A trainer encourages and assists trainees to learn for themselves. Trainees are likely to work in groups (pairs) and all doing something different. Some are doing practical tasks in the workshop, some writing, some not even in the classroom or workshop but in another part of the building using special equipment. As trainees learn at different pace they might be at different stages in their learning, thus learning must be tailored to suit individual needs. The following facilitation methods (teaching strategies) are generally employed.

Purpose of the training program:

The purpose of the training is to provide skilled manpower to improve the existing construction industry. More than 96 % of the Pakistani manpower is working in GCC countries where Saudi Arabia (50.90%) and UAE (33.10%) are the largest destination countries followed by Oman (7.26%), Kuwait (1.90%), Bahrain (1.58%), and Qatar (1.41%). The overseas Pakistanis are playing a pivotal role to support the economy in the form of remittances. According to new labor laws, a large number of skilled labors is demanded by Saudi Government especially for the construction sector. For this purpose, new qualifications have



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been developed by NAVTTTC on CBT&A mode in order to train the unskilled human resource with employable skills and cater the demand of Saudi Government. Moreover, the availability of skilled professionals will bring socio-economic benefits to all stakeholders.

Overall objectives of training program:

The main objectives of the National Vocational Certificate Level 4 in Mining Process Technology (Senior Technician/Shot Firer) are as follows:

- Ensure compliance with workplace policies and procedures to maintain operational efficiency.
- Demonstrate effective verbal and written communication in a mining context.
- Implement and follow occupational health and safety standard operating procedures.
- Exhibit professional behavior, ethics, and work discipline in the workplace.
- Create accurate and functional 3D drawings for mining and technical applications.
- Plan and design safe and efficient blasting operations using appropriate methods.
- Apply underground mining techniques with emphasis on safety and productivity.
- Execute surface mining operations using standard procedures and equipment.
- Install appropriate ground support systems to maintain underground stability.
- Maintain strict inventory control and documentation of explosives after issuance.
- Apply basic environmental (green) practices to reduce ecological impact at mining sites.

Competencies to be gained after completion of course:

At the end of the course, the trainee has attained the following core competencies:

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1. Monitor Workplace Policy and Procedures
2. Perform Effective communication Skills
3. Maintain Occupational Health and Safety SOPs System
4. Maintain Professionalism in Workplace
5. Develop 3D Drawing



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6. Design Blasting Operations
7. Perform Underground Mining Technique
8. Perform Surface Mining Technique
9. Install Ground Support
10. Ensure Explosives Chain of custody & Inventory Control after issuance
11. Perform Basic Green Skills at Mining Site

Possible available job opportunities, available immediately and later in the future:

Possible Career paths

- Senior Technician
- Shot Firer
- Superintendent



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Trainee entry level:

The entry level for National Vocational Certificate Level 4 in Mining Sector **(Senior Technician/shot firer)** is given below:

Title	Entry requirements
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Minimum qualification of trainer:

- A. Must be a holder of DAE/Level 5 in the relevant field with at least 2 years relevant experience
- OR
- B. Minimum 16 years of education in the relevant field
- C. IT/Computer education will be preferred

Recommended trainer: trainee ratio

The recommended maximum trainer: trainee ratio for this program is 1 trainer for 25 trainees.

Medium of instruction i.e. language of instruction:

Instructions will be in Urdu/ English/ Local language.



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Duration of the course (Total time, Theory & Practical time):

The distribution of contact hours is given below:

Total	-	1200 hours
Theory	-	240hours (20%)
Practical	-	960 hours (80%)

Proposed Course Duration-12 Months

Sequence of modules:

Module-1 Monitor Workplace Policy and Procedures	Module-6 Design Blasting Operations	Module-7 Perform Underground Mining Technique
Module-2 Perform Effective Communication Skills		Module-8 Perform Surface Mining Technique
Module-3 Maintain Occupational Health and Safety SoPs System		Module-9 Install Ground Support
Module-4 Maintain Professionalism in Workplace		Module-10 Ensure Explosives Chain of custody & Inventory Control after issuance
Module-5 Develop 3D Drawing		Module-11 Perform Basic Green Skills at Mining Site



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Summary Template-Overview of the Curriculum:

Following is the structure of the course:

Sr. No	Code	Competency Standards	Occupation	NVQF Level	Category	Estimated Contact Hours			Cr Hr
						Th.	Pr	Total	
Level 4 in Mining Process Technology (Senior Technician/Shot Firer)									
1.	724MP14-A	Monitor Workplace Policy and Procedures	Senior Technician/Shot Firer	4	Generic	12	18	30	3
2.	724CO09-B	Perform effective Communication skills		4	Generic	20	30	50	5
3.	724MP14-C	Maintain Occupational Health and Safety SoPs System		4	Generic	20	30	50	5
4.	724MP14-D	Maintain Professionalism in Workplace		4	Generic	20	30	50	5
5.	724MP14-E	Develop 3D Drawing		4	Technical	14	66	80	8
6.	724MP14-F	Design Blasting Operations		4	Technical	31	99	130	13



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7.	724MP14-G	Perform Underground Mining Technique		4	Technical	26	114	140	14
8.	724MP14-H	Perform Surface Mining Technique		4	Technical	24	114	140	14
9.	724MP14-I	Install Ground Support		4	Technical	24	126	150	15
10.	724MP14-J	Ensure Explosives Chain of custody & Inventory control after issuance		4	Technical	29	171	200	20
11.	724MP14-K	Perform Basic Green Skills for Mining		4	Generic	9	21	30	3
Total						240	960	1200	120
Percentage						20	80		



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Summary – overview of the curriculum

Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
Module 1: Monitor Workplace Policy and Procedures Aim: After successful completion of this module, the trainee is competent in analyzing workplace policy and procedures	LU1: Plan and organize work LU2: Manage to convene meeting LU3: Set and meet own work priorities at instant LU4: Develop and maintain professional competence LU5: Follow and implement work safety requirements	12	18	30
Module 2: Perform Effective Communication Skills Aim: After successful completion of this module, the trainee is competent in performing advance communication	LU1: Demonstrate basic communication skills LU2: Conduct Professional Activities Ethically LU3: Resolve conflicts and misunderstandings LU4: Report hazards and incidents clearly	20	30	50



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Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
Module 3: Maintain Occupational Health and Safety SoPs System Aim: After successful completion of this module, the trainee is competent in establishing and maintaining the occupational health and safety system	LU1: Implement Health and Safety policies and procedures LU2: Carryout risk assessment at workplace LU3: Follow emergency response protocol/procedures LU4: Perform safe storage and disposal of waste LU5: Maintain ergonomics condition at workplace	20	30	50
Module 4: Maintain Professionalism at Workplace Aim: After successful completion of this module, the trainee is competent in maintaining professionalism in workplace	LU1: Respect Work Timeframes LU2: Maintain Personal Appearance and Hygiene LU3: Work in An Ethical Manner LU4: Support continuous professional development	20	30	50



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Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
Module 5: Develop 3D Drawing Aim: After successful completion of this module, the trainee is competent in making 3D models in AutoCAD	LU1: Develop 3D objects LU2: Manipulate 3D objects using 3D editing tools LU3: Render 3D Model	14	66	80
Module 6: Design Blasting Operations Aim: After successful completion of this module, the trainee is competent in performing safe blasting at mine site.	LU1: Plan blasting operations LU2: Identify explosive materials for blasting LU3: Identify initiation systems LU4: Comprehend blasting operation LU5: Perform post blasting inspection LU6: Secure the blast site before and after detonation	31	99	130



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Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
Module 9: Perform Underground Mining Technique Aim: After successful completion of this module, the trainee is competent in performing the underground mining	LU1: Perform room and pillar method LU2: Perform long wall method LU3: Perform stope and pillar method	26	114	140
Module 7: Perform Surface Mining Technique Aim: After successful completion of this module, the trainee is competent in performing surface mining technique	LU1: Perform Open Pit Mining LU2: Perform Strip Mining LU3: Perform Placer Mining LU4: Perform quarry mining	26	114	140



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Module 8: Install Ground Support Aim: After successful completion of this module, the trainee is competent in installing ground support	LU1: Prepare for Installation LU2: Assemble Ground Support LU3: Install Ground Support	24	126	150
Module 10: Ensure Explosives Chain of custody & Inventory Control after issuance Aim: After successful completion of this module, the trainee is competent in Safe handling & record maintenance of explosive material	LU1: Maintain explosive inventory logbook LU2: Ensure custody at blasting site LU3: Generate post blast consumption report LU4: Ensure return of unused explosive (if any)	29	171	200
Module 11: Perform Basic Green Skills at Mining Site Aim: After successful completion of this module, the trainee is competent in performing basic green skills for mining	LU1: Manage sustainability of materials used at site LU2: Manage mining waste	9	21	30



Module 1: Monitor Workplace Policy and Procedures

Objective:

This unit describes the skills and knowledge required to implement a workplace policy & procedures and to modify the policy to suit changed circumstances. It applies to individuals with managerial responsibilities who undertake work developing approaches to create, monitor and improve strategies and policies within workplaces and engage with a range of relevant stakeholders and specialists.

Duration: 30Hours

Theory: 12 Hours

Practice: 18 Hours

Credit Hours: 3

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Plan and Organize work	The trainees will be able to: - Complete work tasks within deadlines according to order of priority - Supervisors are informed of any delays in work times or projects	- Importance of time management strategies Activity - Practice completing assignment within deadline.	Total:06rs Theory:03hrs Practical:03hrs	Consumable - Notebooks - Pencils - Erasers - Sharpeners - Pen Non Consumable - White board - Multimedia - Internet - Computer system	Class room



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU2: Manage to convene meeting	The trainees will be able to: 1. Develop agenda in line with meeting purpose 2. Select participants and notify them accordingly 3. Carryout meeting arrangements according to the time 4. Record the minutes of the meeting	• Explain meeting terminologies • Importance of structures and arrangement of meeting • Explain the organizational procedures and policies regarding meetings, chairing and minutes. Activity • Practice to develop an agenda for a meeting • Practice to write minutes of minutes.	Total:06hrs Theory:03hrs Practical:03hrs	Consumable • Notebooks • Pencils • Erasers • Sharpeners • Pen Non Consumable • White board • Multimedia • Internet • Computer system	Class room
LU3: Set and	The trainee will be		Total:06hrs	Consumable	Class room



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
meet own work priorities at instant	able to: - Take the initiative to prioritize and facilitate competing demands to achieve organizational goals and objectives - Use technology efficiently and effectively to manage work priorities and commitments - Maintain appropriate work-life balance	Describe Healthy work life balance Activity Practice to set and meet own work	Theory:02hrs Practical:04hrs	- Notebooks - Pencils - Erasers - Sharpeners - Pen Non Consumable - White board - Multimedia - Internet - Computer system	



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU4: Develop and maintain professional competence	The trainee will be able to: - Assess personal knowledge and skills against competency - Participate in networks to enhance personal knowledge, skills and work relationships - Seek feedback from employees, clients and colleagues to develop and improve competence	- Explain professional competence - Importance of feedback <u>Activity</u> - Practice to fill different feedback forms	Total:06hrs Theory:02hrs Practical:04hrs	Consumable - Notebooks - Pencils - Erasers - Sharpeners - Pen - Feedback forms Non Consumable - White board - Multimedia - Internet - Computer system	Class room



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU5: Follow and implement work safety requirements	The trainee will be able to: - Identify and report emergency incidents - Practice organizational policy and procedures for responding to emergency incidents - Identify and implement workplace procedures and work instructions for controlling risks	- Explain the emergency incidents - Importance of organizational policy and procedures for emergency incidents Activity - Practice to prepare report on emergency incidents	Total: 06hrs Theory: 02hrs Practical: 04hrs	Consumable - Notebooks - Pencils - Erasers - Sharpeners - Pen Non Consumable - White board - Multimedia - Internet - Computer system	Class room



Module 2: Perform Effective Communication Skills

Objective of the module:

The objectives of this unit describe the performance outcomes, skills and knowledge required to develop communication skills used professionally. It covers plan and organize work and conduct trainings at workplace, along with demonstrating professional skills independently.

Duration: 50 Hours

Theory: 20 Hours

Practice: 30 Hours

Credit Hours: 05

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Demonstrate basic communication skills	The trainee will be able to: - Assess the specific and relevant information from the appropriate sources - Convey the information using the appropriate medium and ideas - Use appropriate non-verbal communication - Identify appropriate	- Describe the importance of effective communication - State different Sources of information - State different mode of communication - Explain types of non-verbal communication - Explain mode of communication while operating machines - Explain the method of recording the information/instructions. Activity:	Total: 13hrs Theory: 05hrs Practical: 08hrs	Consumable - Notebooks - Pencils - Erasers - Sharpeners - Pen - White board marker - Duster Non-Consumable - White board - Multimedia - Internet - Computer	Class Room



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	lines of communication with supervisors and colleagues - Use the defined workplace procedures for storage of information - Inform co-workers and superiors about any deviation	- Role Play each trainee introduce himself. - Convey the job description and company general rules and regulations to fellow workers		system	



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LU2: Conduct Professional Activities Ethically	The trainee will be able to: • Identify the individual role and responsibilities within the team environment. • Recognize the roles and responsibility of other team members. • Report relationships within team and external to team Share report with co-workers.	•Describe the importance of creating cooperative work environment •Describe the role and objective of team. •Explain risk of failure team work on the project. •Describe the importance of resolving the co-worker's problems •State plan work and organize required resources in coordination with team <u>Activity:</u> •Role Play, get instruction regarding job order from supervisor and convey it to coworkers according	Total:13hrs Theory:05hrs Practical:08hrs	Consumable • Notebooks • Pencils • Erasers • Sharpeners • White board marker • Duster Non Consumable • White board • Multimedia • Internet Computer system	Class Room
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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU3: Resolve conflicts and misunderstanding	The trainee will be able to: - To identify the cause of conflict through active listening - Encourage the respectful communication between parties - Facilitate a collaborative approach to find mutually acceptable Solutions	Describe how to identify the conflict Activity: Participate in mock meeting for preparation to perform job.	Total:12hrs Theory:05hrs Practical:07hrs	Consumable - Notebooks - Pencils - Erasers - Sharpeners - White board marker Non Consumable - White board - Multimedia - Internet Computer system	Classroom
LU4: Report Hazards and incidents clearly	The trainee will be able to: - Identify the nature of the hazard or incident - Notify the concerned	Describe how to identify the hazard Activity: Participate in mock activity in hazard identification and its	Total:12hrs Theory:05hrs Practical:07hrs	Consumable - Notebooks - Pencils - Erasers - Sharpeners	Classroom



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	authority Record the detailed information in the incident report	reporting procedure		- White board marker Non Consumable - White board - Multimedia - Internet Computer system	
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Module 3: Maintain Occupational Health and Safety SoPs System

Objective of the module: The aim of this module is to get knowledge to establish, maintain and evaluate an occupational health and safety system in the work environment.

Duration: 50Hours **Theory:** 20Hours **Practice:** 30Hours **Credit Hours:** 5

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Implement health and safety policies and procedures	The trainee will be able to: - Identify and follow workplace safety rules - Use personal protective equipment properly - Report hazards and unsafe conditions promptly - Respond correctly to emergency situations - Apply safety procedures during all tasks	- Types and purposes of health and safety policies - Common workplace hazards and risk controls - Use and maintenance of personal protective equipment (PPE) - Procedures for reporting incidents and unsafe conditions - Emergency response protocols and evacuation procedures Activity: - Perform how to respond to an emergency in site area	Total:10hrs Theory: 4hrs Practical: 6hrs	Consumable - Notebooks - Pencils - Erasers - Sharpeners - White board marker Non Consumable - White board - PPES - Multimedia - Computer	- Class Room - Simulated environment



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU2: Carryout risk assessment at workplace	The trainee will be able to: - Identify emergency exits at workplace - Select suitable positions for the - Identify assembly area at workplace - Follow procedure and instructions to evacuate the building - Report immediately at designated assembly area in case of emergency	- Explain different types of emergencies at work place - Knowledge about emergency protocol/procedures for fire, hazardous chemical spillage, major power failure, terrorism activities and natural disasters - Understanding of current safety /emergency principles and practices at workplace <u>Activity:</u> - Perform mock drill for emergency response plan	Total:10hrs Theory: 4hrs Practical: 6hrs	Consumable - Notebooks - Pencils - Erasers - Sharpeners - White board marker Non Consumable - White board - Multimedia - PPEs - Computer System	- Classroom - Simulated environment



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LU3: Follow emergency response protocol/procedure	The trainee will be able to: - Identify emergency exits at workplace - Select suitable positions for the - Identify assembly area at workplace - Follow procedure and instructions to evacuate the building - Report immediately at designated assembly area in case of emergency	- Explain different types of emergencies at work place - Knowledge about emergency protocol/procedures for fire, hazardous chemical spillage, major power failure, terrorism activities and natural disasters - Understanding of current safety /emergency principles and practices at workplace Activity: Perform mock drill for emergency response plan	Total:10hrs Theory: 4hrs Practical: 6hrs	- Emergency plan manual - First aid kit - Fire extinguisher - PPE (gloves, helmet, mask) - Evacuation map - Emergency contact list - Alarm or siren - Radio or whistle - Incident report form - Stretcher	Classroom/ workshop
LU4: Perform safe storage and disposal of waste	The trainee will be able to: - Identify different types of waste material - Identify types of containers to store the	- Explain standard working posture/position at workplace - Explain standard procedure for sufficient light at workplace - Describe types of noises at workplace	Total:10hrs Theory: 4hrs Practical: 6hrs	Consumable - Notebooks - Pencils - Erasers - Sharpeners	- Class Room - Simulated environment



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	- different types of waste material - Use required labels on storage containers - Store the waste materials according to standards - Identify types of waste bins - Dispose- off waste material according to the safety procedure	- Knowledge about types of hazardous waste - standard procedure for ventilation at workplace <u>Activity:</u> Practice of preparing ergonomic workstation		- White board marker Non Consumable - White board - PPEs - Multimedia - Computer	



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU5: Maintain ergonomics condition at workplace	The trainee will be able to: - Follow standard working posture/position at workplace - Follow standard procedure to provide sufficient light at workplace - Use ergonomic workstations to avoid muscle fatigue	- Recognize different types of hazards causing harm to workers. - Knowledge about health and safety precautions - Describe the methods to identify the risks and/or hazards at workplace - Knowledge about methods of dealing with hazard to avoid any accident or injury <u>Activity:</u> Perform risk assessment at work place	Total:10hrs Theory: 4hrs Practical: 6hrs	Consumable - Notebooks - Pencils - Erasers - Sharpeners - White board marker Non Consumable - White board - PPEs - Multimedia - Computer	- Class Room - Simulated environment



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Module 4: Maintain Professionalism in Workplace

Objective of the module: The aim of this module is to get knowledge, skills and understanding to maintain professionalism in the workplace

Duration: 50 Hours

Theory: 20Hours

Practice: 30Hours

Credit Hours: 05

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Respect Work Timeframes	The trainee will be able to: - Demonstrate punctuality in meeting, set working hours and times. - Utilize working hours only for working and follow company regulations. - Complete work tasks within deadlines according to order of priority - Perform extra ordinary during working hours	- Define company regulations Activity: - Prepare worksheet of duties	Total: 13hrs Theory: 05hrs Practical: 08hrs	Consumable - Notebooks - Erasers - Sharpener - White board marker - Duster Non Consumable - White board - Multimedia - Internet - Computer system	Class Room/site



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU2. Maintain Personal Appearance and Hygiene	The trainee will be able to: - Clean hair, body and nails regularly. - Wear suitable cloths for the workplace, and respect local and cultural contexts - Meet specific company dress code requirements - Keep smiling and have positive body language during working hours	- Define company safety requirements or rules during working <u>Activity:</u> - Demonstrate the specific mine dress code and conduct	Total: 13hrs Theory: 05hrs Practical: 08hrs	Consumable - Notebooks - Erasers - Sharpener - White board marker - Duster Non Consumable - White board - Multimedia - Internet - Computer system	Class Room/site
LU3. Work in an Ethical Manner	The trainee will be able to: - Respect personal space of colleagues and clients with reference to local customs and cultural contexts. - Avoid cross transmission	- Define ways to transmit infections - How to behave with clients <u>Activity:</u> Demonstrate adequate distance	Total: 12hrs Theory: 05hrs Practical: 07hrs	Consumable - Notebooks - Erasers - Sharpener - White board marker - Duster	Class Room/site



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	of infections (especially through respiration).	with colleagues and clients		Non-Consumable - White board - Multimedia - Internet - Computer system	
LU4. Support continuous professional development	The trainee will be able to: - Follow company values/ethics codes of ethics and/or conduct, policies and guidelines. - Use company resources in accordance with company ethical standards. - Undertake work practices in compliance with company ethical standards, organizational policy and guidelines.	- Define ethic codes - Define ethical standards - Understanding of organizational policies - Define company protocols Activity: - Demonstrate mines values/ethics codes of ethics and conduct.	Total: 12hrs Theory: 05hrs Practical: 07hrs	Consumable - Notebooks - Erasers - Sharpeners - White board marker - Duster Non-Consumable - White board - Multimedia - Internet	Class Room/site



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	- Instruct co-workers on ethical, lawful and reasonable directives. - Share Company values/practices with co- workers using appropriate behavior and language. - Report works incidents/situations and/or resolved in accordance with company protocol/guidelines.			Computer system	



Module 5- Develop 3D Drawing

Objective of the module: The aim of this module is to get the skills and knowledge required to develop 3D objects, manipulate and Edit 3D objects and render 3D objects. The underpinning knowledge regarding 3D drawings will be sufficient to provide the basis for the trainee's work.

Duration: 80 Hours

Theory: 14 Hours

Practice: 66 Hours

Credit Hours: 08

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1:Develop 3D Objects	The trainee will be able to: - Select suitable 3D modeling tool - Create basic 3D shapes - Apply correct dimensions - Modify objects using tools - Save model in proper format	- Types of 3D modeling software - Basic geometric shapes in 3D design - Dimensioning techniques in modeling - Tools for modifying 3D objects - File formats for saving 3D models Activity: - Create and modify a basic 3D object using appropriate modeling tools.	Total: 27hrs Theory:05hrs Practical:22hrs	Consumable - Task instruction sheet - Paper for notes or printing - Pen or pencil - USB drive (if one-time use) - Sticky notes or labels Non Consumable - Computer or laptop 3D modeling software - Internet connection - Reference manuals - Display screen	Class Room/ workshop



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU2: Manipulate 3D objects using 3D editing tools	The trainee will be able to: • Select appropriate 3D editing tools • Move objects in 3D space correctly • Rotate objects along desired axes • Scale objects to required proportions • Modify shapes by editing vertices or surfaces	• Functions of 3D editing tools (move, rotate, scale) • Coordinate systems in 3D space (X, Y, Z axes) • Object transformation principles • Vertex, edge, and face manipulation • Object grouping and alignment • Precision editing techniques • Common 3D software interfaces • File updating and saving techniques • Shortcut keys for efficient editing • Troubleshooting basic editing errors <u>Activity:</u> • Transform a 3D object using editing tools	Total: 27hrs Theory:05hrs Practical:22hrs	Consumable • Task instruction sheet • Paper for notes or printing • Pen or pencil • USB drive (if one-time use) • Sticky notes or labels Non Consumable • Computer or laptop • 3D modeling software • Internet connection • Reference manuals • Display screen	Class Room/ workshop



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU3: Render 3D Model	The trainee will be able to: • Select appropriate rendering settings • Apply lighting to enhance realism • Use materials and textures correctly • Generate high-quality rendered images • Export final render in required format	• Types of rendering (real-time, photorealistic) • Lighting techniques in 3D environments • Material and texture mapping basics • Rendering settings and quality control • Export formats for rendered outputs <u>Activity:</u> • Render a 3D object with lighting and materials	Total: 26hrs Theory:04hrs Practical:22hrs	Consumable • Task instruction sheet • Paper for notes or printing • Pen or pencil • USB drive (if one-time use) • Sticky notes or labels Non Consumable • Computer or laptop • 3D modeling software • Internet connection • Reference manuals • Display screen	• Class Room/ workshop



Module 6- Design Blasting Operations

Objective: The aim of this module is to get knowledge and skills required to design blasting operations effectively.

Duration: 130 Hours Theory: 31Hours Practice: 99 Hours Credit Hours: 13

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Plan Blasting Operation	Trainee will be able to: - Interpret site conditions and blasting requirements - Select suitable explosives and initiation systems - Design blast layout and timing sequence - Ensure safety measures are incorporated into the plan - Prepare complete documentation for blasting approval	- Types and characteristics of explosives and initiation systems - Site assessment techniques and geological considerations - Blast pattern design and timing principles - Safety and regulatory requirements in blast planning - Documentation and approval procedures for blasting operations Activity: Prepare a Blasting Operation Plan	Theory- 6hrs Practical- 17hrs Total- 23rs	Consumable - Blast design worksheets or templates - Printed site maps or drawings - Pens or markers Non Consumable - Calculator or blast design software - PPE (helmet, gloves, goggles – for demo) - Computer or laptop for plan preparation	Class Room / Site



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LU2. Identify Explosive Materials for Blasting	Trainee will be able to: - Explosives classification chart (high/low explosives, sensitivity, strength) - MSDS (Material Safety Data Sheets) for common explosives - Explosive types comparison table (e.g., ANFO, emulsion, slurry, detonators) - Images or samples (mock) of explosive materials and packaging - Regulatory guidelines/manuals on explosive storage and use	- Describe common blasting explosives - Classify explosives by type and use - Read labels and safety markings - Match explosives to site needs - Follow legal and safety rules Activity: - Identify and classify explosive materials	Theory- 05hrs Practical- 17hrs Total- 22rs	Consumable - Worksheets - Labels or tags - Printed explosive charts Non Consumable - Mock explosive samples - PPE (helmet, gloves, goggles) - Display board or table setup	Class Room/ Site
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LU3. Identify Initiation Systems	Trainee will be able to: - Recognize different types of initiation systems (electric, non-electric, electronic) - Understand the components and function of each system - Match initiation systems to specific blasting applications - Interpret color codes and timing delays - Apply safety standards when handling initiation systems	- Types of initiation systems (electric, non-electric, electronic) - Components of initiation systems (detonators, connectors, shock tubes, etc.) - Delay timing systems and color coding - Applications of each initiation system in blasting scenarios - Safety procedures and legal requirements for handling initiation systems Activity: - Identify and classify blasting initiation system	Theory- 05hrs Practical- 17hrs Total- 22rs	Consumable - Labels or tags - Identification worksheets - Printed delay timing charts Non Consumable - Mock initiation systems - PPE (helmet, gloves, goggles) - Display table or training board	Class Room / Site
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LU4. Comprehend Blasting Operation	Trainee will be able to: - Understand the full blasting process from planning to post-blast - Identify roles and responsibilities in a blasting operation - Interpret blast design plans and timing sequences - Recognize safety measures and regulatory requirements - Describe environmental and site considerations during blasting	- Stages of a blasting operation (pre-blast, blast, post-blast) - Roles of personnel involved in blasting - Components of blast design (burden, spacing, timing, pattern) - Safety protocols and regulatory standards - Environmental impacts and control measures during blasting <u>Activity:</u> - Analyze a complete blasting operation scenario	Theory- 05hrs Practical- 16hrs Total- 21rs	Consumable - Scenario worksheets - Printed blast diagrams - Pens or markers Non Consumable - PPE (helmet, gloves, goggles) - Sample blast design model or chart - Projector or whiteboard (for explanation)	Class Room / Site
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LU5. Perform post blasting inspection	Trainee will be able to: - Identify and assess post-blast hazards and misfires - Inspect blast site for structural stability and loose material - Verify blast results against the blast plan - Report findings accurately using inspection checklists - Follow post-blast safety procedures and clearance protocols	- Stages of a blasting operation (pre-blast, execution, post-blast) - Types and functions of blasting equipment and materials - Basic blast design principles (burden, spacing, timing) - Safety procedures and legal regulations in blasting - Environmental impacts and mitigation during blasting <u>Activity:</u> - Analyze and explain a blasting operation	Theory- 05hrs Practical- 16hrs Total- 21rs	Consumable - Printed blasting scenario sheets - Worksheets or analysis forms - Pens or markers Non Consumable - PPE (helmet, gloves, goggles) - Blast pattern models or charts - Whiteboard or projector (for presentation)	Class Room / Site
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LU6: Secure the blast site before and after detonation	Trainee will be able to: - Identify hazards and restricted zones around blast sites - Set up warning signs, barriers, and signals effectively - Ensure clearance of unauthorized personnel before detonation - Monitor the area for safety after blasting is complete - Follow post-blast site security and access control procedures	- Procedures for establishing safety zones and exclusion areas - Types and use of barriers, warning signs, and signals - Roles and responsibilities of personnel in site security - Pre- and post-blast clearance and verification steps - Legal and safety regulations for blast site control Activity: - Simulate blast site security procedure	Theory- 05hrs Practical- 16hrs Total- 21rs	Consumable: - Warning signs (paper or plastic) - Site security checklist forms - Barrier tape or marking Non Consumables - PPE (helmet, vest, gloves) - Cones or barricades - Whistle or simulated alert device (e.g., siren)	Class Room / Site
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Module 7- Perform Underground Mining Techniques

Objective of the module: The aim of this module is to get knowledge, skills and understanding to perform room and pillar, long wall method for underground mining.

Duration: 140 Hours

Theory: 26Hours

Practice: 114 Hours

Credit Hours: 14

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Perform Room and Pillar Method	The trainee will be able to: - Conduct rock face preparation for underground mining - Use room and pillar mining method in coal, salt and large ore deposits - Identify horizontal plane - Create horizontal	- Define underground mining - Explain room and pillar mining method - Define horizontal plane - Define environmental safety factors Activity: - Practice to create horizontal arrays of rooms and pillar - Practice to cut a slot as deep as possible along the bottom of a section of ore - Practice to create a pile of ore	Total- 47hrs Theory- 09hrs Practical- 38hrs	Consumable - Notebooks - Pencils - Erasers - Sharpeners - White board marker - Duster Non Consumable - White board - Multimedia - Internet	Class room/site



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	arrays of rooms and pillar • Cut a slot as deep as possible along the bottom of a section of ore • Create a pile of ore that is loaded and hauled out of the mine • Retreat the mining • Maintain all post operation activities	that is loaded and hauled out of the mine		• Computer system • Drill • Explosive material • Long wall shearer • Conveyor belt • Continues miner • Hydraulic support	
LU2: Perform Long Wall Method	The trainee will be able to: • Recognize the	• Explain coal mining • Define hydraulic support	Total- 47hrs Theory- 09hrs Practical- 38hrs	Consumable • Notebooks • Pencils	• Class room/site



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	limits of long wall mining • Fix hydraulic supports • Identify the distance for mining • Maintain all post operation activities	• Define environmental safety factors <u>Activity:</u> • Practice to set hydraulic supports that are located parallel to the mining face • Practice to maintain all post operation activities as per environmental safety factors		• Erasers • Sharpeners • White board marker • Duster Non Consumable • White board • Multimedia • Internet • Computer system • Drill • Explosive material • Long wall shearer • Conveyor belt • Continues miner • Hydraulic support	



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LU3: Perform Stope and Pillar method	The trainee will be able to: • Identify and mark stope boundaries correctly • Drill blast holes in designated stope areas • Maintain safe and effective pillar spacing • Extract broken ore using proper techniques • Apply safety procedures during all stope activities	• Mark stope boundaries with accuracy • Drill blast holes in correct locations • Maintain appropriate pillar spacing • Remove broken ore using safe methods • Inspect stope roof and wall conditions • Apply safety protocols during all operations Activity: • Execute basic stope and pillar mining operation	Total- 46hrs Theory- 08hrs Practical- 38hrs	Consumable • Notebooks • Pencils • Erasers • Sharpeners • White board marker • Duster Non Consumable • White board • Multimedia Internet • Computer system • Drill • Explosive material • Long wall shearer • Conveyor belt • Continues miner - Hydraulic support	Class room/site
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Module8- Perform Surface Mining Techniques

Objective of the module: The aim of this module to get knowledge, skills and understanding to perform surface mining techniques

Duration: 140 Hours

Theory: 26 Hours

Practice: 114Hours

Credit Hours: 14

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Perform Open Pit Mining	Trainee will be able to: - Conduct rock face preparation for open pit mining - Carry out drill holes for core sampling of ore - Generate the Isopach map of ore body - Remove top soil and create benches to assess the ore body - Carry out drilling and blasting process for	- Describe open pit mining - Knowledge of core sampling - Define Isopach map of ore body - Understanding of removal of top soil - Knowledge of load and transport required material Activity: - Practice to generate the Isopach map of ore body	Total: 35hrs Theory: 07hrs Practical:28hrs	Consumable - Notebooks - Pencils - Erasers - Sharpener - White Board marker - Duster - USB Non Consumable - White board - Multimedia - Internet - Computer system - Printer - Drilling machine - Explosive material - Excavator	Class room/site



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	extraction of ore Load and transport the required material	- Practice to conduct rock face preparation for open pit mining using required machinery - Practice to carry out drilling and blasting process for extraction of ore		- Dozer - Dumpers - Jackhammer - Pan - Rocker box - Sluice box - Trommel (Optional)	
LU2. Perform Strip Mining	Trainee will be able to: - Remove a long strip of overlying soil and overburden rock - Carry out drill holes - Collect the core samples of ore deposit - Generate the isopach map of ore body	- How to carry out drill holes - Define Isopach map of ore body - Define blasting process - Knowledge of load and transport required material Activity: - Practice to remove a long strip of overlying soil and rock (the overburden)	Total: 35hrs Theory: 07hrs Practical: 28hrs	Consumable - Notebooks - Pencils - Erasers - Sharpener - White Board marker - Duster - USB Non Consumable - White board - Multimedia - Internet - Computer system - Printer - Drilling machine	Class room/site



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	- Remove top soil - Carry out drilling and blasting process - Load and transport the required material	Practice to generate the Isopach map of ore body		- Explosive material - Excavator - Dozer - Dumpers - Jackhammer - Pan - Rocker box - Sluice box - Trommel (Optional)	
LU3. Perform Placer Mining	Trainee will be able to: - Collect the sample as per required procedure - Apply the following methods for up gradation of ore - Panning - Rocker box - Sluice box - Dry washing - Trommel (Optional)	- Describe procedures for sample collection - Explain procedure of sluice box - Define Trommel Activity: - Demonstrate following methods for up gradation of ore - Panning - Rocker box - Sluice box - Dry washing	Total: 35hrs Theory: 06hrs Practical: 29hrs	Consumable - Notebooks - Pencils - Erasers - Sharpener - White Board marker - Duster - USB Non Consumable - White board - Multimedia - Internet - Computer system - Printer - Drilling machine	Class room/site



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
				- Explosive material - Excavator - Dozer - Dumpers - Jackhammer - Pan - Rocker box - Sluice box - Trommel (Optional)	
LU4: Perform Quarry Mining	Trainee will be able to: - Mark quarry boundaries using site plans - Drill blast holes in designated locations - Apply controlled blasting techniques - Load blasted material safely into transport - Inspect quarry faces for structural stability	- Identify and mark quarry boundaries accurately - Drill and prepare blast holes according to plan - Perform controlled blasting to break rock - Operate equipment to load and transport material - Inspect quarry faces for safety and stability Activity: Conduct basic quarry mining operations	Total: 35hrs Theory: 06hrs Practical: 29hrs	Consumable: - Marking chalk or paint - Wooden stakes or boundary flags - Blasting caps or dummy charges (training use) - Fuel or batteries for equipment (if used) - Printed quarry layout maps - Inspection forms or checklists - Notepads or logbooks Non-consumables: - Drill machine or drilling simulator - Transport equipment	Class room/site



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				(e.g., wheelbarrow, loader, truck) • PPE (helmet, gloves, goggles, boots) • Measuring tape or distance meter • Quarry model or designated training area • Safety cones or barriers • Communication tools (radio, whistle)	
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Module 9- Install Ground Support

Objective: This competency standard covers the skills and knowledge required to install ground support for mining excavation and transportation.

Duration: 150Hours

Theory: 24Hours

Practice: 126 Hours

Credit Hours: 15

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Prepare for installation	Trainee will be able to: - Select & wear PPEs - Select ground support equipment - Remove all surface soils and vegetation - Scale down loose material - Position drill holes according to ground support plan	- Define bedrock - Define capacity equipment Activity: - Practice to position drill at designated angle and according to capacity of equipment - Practice to position and mark drill holes according to ground support design and ground support plan to	Total:50hrs Theory:08hrs Practical:42hrs	Consumable - Notebooks - Pencils - Erasers - Sharpeners - White Board marker - Duster - USB Non Consumable - White board - Multimedia - Internet - Computer system - Printer	Class room/site



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		maximize lamination of rock layers		• PPEs • Water suppressing device • Ancillary equipment (generators, pumps, lights, compressors, cleaning equipment, power tools, hand tools) • Cutting implement • Drill rigs • Lifting and handling equipment (winch, crane, block and tackles)	
LU2. Assemble Ground Support	Trainee will be able to: • Assemble anchors to full depth • Drill holes to specified	• Describe procedure of installation of anchors and bolt to pattern and tensioning degree • Knowledge of water	Total: 50hrs Theory: 08hrs Practical: 42hrs	Consumable • Notebooks • Pencils • Erasers • Sharpeners • White Board marker	Class room/site



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	diameter and depth • Install and tension anchors and bolt to ◦ pattern and tensioning degree • Install water suppression devices minimizing water infiltration to ground supports • Check ground support periodically and adjusts stressing • Perform housekeeping activities	suppression devices • Define creepage • Understanding of housekeeping activities <u>Activity:</u> • Assemble anchors to full depth according to ground support plan • Install tension anchors and bolt to appropriate pattern and tensioning degree		• Duster • USB Non Consumable • White board • Multimedia • Internet • Computer system • Printer • PPEs • Water suppressing device • Ancillary equipment (generators, pumps, lights, compressors, cleaning equipment, power tools, hand tools) • Cutting implement • Drill rigs • Lifting and handling equipment (winch, crane, block and tackles)	
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LU3: Install Ground Support	Trainee will be able to: • Position ground support materials accurately • Drill holes to the correct depth and location • Insert bolts or anchors using proper techniques • Tighten support elements to required tension • Inspect installed supports for structural stability	• Types and functions of ground support systems • Tools and equipment used for installation • Drilling methods and depth control techniques • Bolt and anchor insertion procedures • Inspection criteria for installed supports Activity: • Install basic ground support system	Total:50hrs Theory:08hrs Practical:42hrs	Consumables: • Rock bolts • Resin cartridges or grout • Washers and bearing plates • Marking chalk or spray paint • Drill bits • Printed installation checklists or forms Non-consumables: • Drill machine (manual or powered) • Torque wrench or spanner • Scaling bar • PPE • Measuring tape or depth gauge • Support mesh (if reusable in training setup) • Training wall or simulated rock surface	Class room/site
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Module 10- Ensure Explosive Chain Custody & Inventory Control after issuance

Objective: The aim of this module is to get knowledge and skills to ensure Explosives Chain of custody & Inventory Control after issuance.

Duration: 200Hours

Theory: 29 Hours

Practice: 171Hours

Credit Hours: 20

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Maintain explosive inventory logbook	Trainee will be able to: - Record types of explosives received accurately - Log issued quantities clearly and consistently - Track storage locations of all explosive items - Update inventory after each transaction - Verify logbook entries against physical stock	- Types and classifications of explosives - Standard procedures for inventory logging - Record-keeping tools and formats (manual/digital) - Inventory reconciliation techniques - Legal and safety requirements for explosive tracking Practical Activity: - Maintain & verify explosive inventory logbook	Theory- 08hrs Practical- 42hrs Total- 50hrs	Consumable - Inventory logbook or printed log sheets - Sample delivery and issue forms - Pens or markers - Sticky labels or tags (for mock explosives) - Paper for calculations or notes Non Consumable - Mock explosive containers or demo items - Shelving or storage racks (simulated)	Class Room / Site



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				storage) • Personal Protective Equipment (PPE) • Lockable storage cabinet (optional) • Computer with inventory softwar	
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LU2. Ensure custody at blasting site	Trainee will be able to: • Receive and handle explosives with proper documentation • Maintain secure custody of explosives until detonation • Identify authorized personnel for explosive handling • Monitor explosive usage during blasting operations • Record handover and custody details accurately	• Procedures for receiving and issuing explosives • Roles and responsibilities in explosive custody • Security protocols for explosive handling at site • Documentation and logbook requirements • Legal and safety standards for explosive custody Activity: • Manage explosive custody at blasting site	Theory- 07hrs Practical- 43hrs Total- 50hrs	Consumable • Custody log sheets • Delivery and issue forms • Marking tags or labels Non Consumable • Mock explosive containers • PPE (helmet, gloves, boots) • Secure storage box or cabinet	Class Room/ Site
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LU3. Generate post blast consumption report	Trainee will be able to: • Collect accurate data on explosives used during blasting • Record quantities by type and batch number correctly • Document blast location and timing details • Compare consumed explosives with issued inventory • Prepare and submit a signed consumption report to supervisor	• Procedures for collecting post-blast data • Methods for recording explosive types and batches • Documentation of blast time and location • Techniques for inventory comparison and reconciliation • Format and structure of official consumption reports <u>Activity:</u> • Prepare a Post-Blast Consumption Report	Theory- 07hrs Practical- 43hrs Total- 50hrs	Consumable • Report forms • Pen or marker • Inventory log sheets Non Consumable • Mock explosive containers • PPE (helmet, gloves, boots) • Clipboard or tablet for data entry	• Class Room / Site
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LU4. Ensure return of unused explosive (if any)	Trainee will be able to: - Identify and separate unused explosives after blasting - Inspect returned explosives for safe condition - Record returned quantities accurately in the log - Transport explosives back to storage securely - Complete return process with authorized confirmation	- Procedures for identifying unused explosives - Inspection methods for returned materials - Return logbook documentation techniques - Safe transport practices for explosives - Roles of authorized personnel in explosive return process Activity: - Demonstrate safe handling, inspection, documentation, and return of unused explosives after a blasting operation.	Theory- 07hrs Practical- 43hrs Total- 50hrs	Consumable - Return log sheets - Marking tags or labels - Authorization forms Non Consumable - Mock explosive containers - PPE (helmet, gloves, boots, goggles) - Storage cabinet or magazine (simulated)	Class Room / Site
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Module 11- Perform Basic Green Skills for Mining Site

Objective: The aim of this module is to get knowledge, skills and understanding to perform green skills required to perform basic green skills for mining. It will also allow you to manage sustainability of materials used at mining and waste at site. Your underpinning knowledge will be sufficient to provide you the basis for your work.

Duration: 30Hours

Theory: 09Hours

Practice: 21Hours

Credit Hours: 03

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Manage sustainability of materials used at crushing plant	The trainee will be able to: 1. Select sustainable raw materials as per requirement 2. Follow standard procedure to manage systems (waste, energy, water) 3. Perform impact quantification of used material at crushing plant	• Environmental degradation • Types of raw materials at crushing plant • Types of waste • Waste reduction techniques • Concept of 6 R approach (Reduce, Reuse, Recycle, Repair, Renew, and Rethink) • Reusable materials • Recyclable materials • Methods for disposal of unusable materials • Just-in-time (JIT) approach • Basic knowledge of green energy resources	Total: 10hrs Theory: 03hrs Practical: 07hrs	Consumable • Notebooks • Pen • Whiteboard marker • Duster Non Consumable • White board • Multimedia • Internet • Computer system • PPES	Classroom/working site



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LU2: Manage crush plant waste	The trainee will be able to: 1. Identify various types of waste at site 2. Sort and categorize reusable waste 3. Dispose unusable waste as per set standards 4. Place reusable material at designated storage area 5. Transport waste material to designated place	• Environmental degradation • Types of raw materials at crushing plant • Types of waste • Waste reduction techniques • Concept of 6 R approach (Reduce, Reuse, Recycle, Repair, Renew, and Rethink) • Reusable materials • Recyclable materials • Methods for disposal of unusable materials • Just-in-time (JIT) approach • Basic knowledge of green energy resources (solar, biogas, natural light, rainwater, wind energy etc.)	Total:10hrs Theory:03hrs Practical:07hrs	Consumable • Notebooks • Pen • White board marker Non Consumable • White board • PPES • Multimedia • Internet • Computer system	Classroom/working site
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LU3: Follow Environment Friendly Blasting Practices	The trainee will be able to: • Identify and select environment-friendly explosives • Apply controlled blasting techniques effectively • Implement measures to minimize fly rock • Reduce ground vibration through blast timing • Dispose of blasting residues safely and legally	• Types and characteristics of low-impact explosives • Principles of controlled blasting techniques • Methods to control fly rock and airblast • Techniques to reduce vibration and noise • Environmental laws and disposal procedures for blast residues Activity: Plan and simulate an eco-friendly blasting operation	Total:10hrs Theory:03hrs Practical:07hrs	Consumables: • Blast design worksheets • Printed environmental guidelines • Marker pens or chalk • Dummy explosive tags or labels • Scenario handouts Non-consumables: • Blasting simulation software or charts • PPE (helmet, gloves, goggles) • Projector or screen for presentation • Sample blasting tools (demo only) • Reference manuals or safety books	Classroom/ working site
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List of Tool, Machinery, Equipment and Consumables:

SR#	Items/Tools /Equipment &Consumables
1.	PPEs: Safety Helmet Safety Shoes Earmuffs Gloves Goggles Face Shields. Surgical Face Masks Safety blanket Safety harness Safety Belts Safety Apron
2.	Safety net



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3.	Shovels with handle
4.	Computer Systems
5.	Scanner
6.	Printer
7.	Chain Hoist
8.	Sieve set
9.	Digital Balance
10.	Fire Buckets.
11.	Fire Extinguishers
12.	First aid Kit
13.	Hooks / Anchors
14.	Manufacturers Operation and Maintenance Manual & Video
15.	Measuring Tape
16.	Multimeter



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17.	Slings
18.	Jackhammer
19.	Cameras
20.	Stationary Items
21.	Excavator
22.	Dozer
23.	Dumpers
24.	Crane Lift
25.	Water suppressing device
26.	Ancillary equipment (generators, pumps, lights, compressors, cleaning equipment, power tools, hand tools)
27.	Cutting implement
28.	Drill rigs
29.	Lifting and handling equipment (winch, crane, block and tackles)
30.	Explosive material



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31.	Trommel (Optional)
32.	Air filter restriction indicator
33.	Mechanical tool kit
34.	Drilling equipment and machine
35.	Sluice box
36.	Rocker box
37.	pH meter
38.	Visual and audio warning devices and lights
39.	Calculator
40.	Inventory register
41.	Screw driver set
42.	Plier
43.	Slip joint plier
44.	Socket set



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45.	Hand hacksaw
46.	Chisel
47.	Tong
48.	Claw hammer
49.	Ball peen Hammer
50.	Straight peen Hammer
51.	Grip pliers
52.	Nose pliers
53.	L-key sets
54.	Pipe wrench
55.	Set of Spanners (Open end, Ring)
56.	Set of Adjustable Wrench
57.	Micrometer
58.	Long wall shearer



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59.	Conveyor belt
60.	Continues miner
61.	Hydraulic support
62.	Tri Square
63.	Steel Rules
64.	Dredging machine and equipment /Attachments
65.	Tool kit
66.	Pan
67.	Blast design software
68.	Laser rangefinder
69.	Seismograph
70.	Blasting logbook



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10.	Muhammad Irfan Zubair	Deputy Director GSP, Lahore
11.	Shahbaz Muhammad	Assistant geophysicist GSP, Lahore
12.	Muhammad Usman Alvi	Scientific Officer, PCSIR LABS, Lahore
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National Vocational Certificate Level 4 in Mining Process Technology (Senior Technician/Shot Firer)



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