



**National Competency Standards for
“Assistant Technician for Mining Process Technology” Level-2**



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



ACKNOWLEDGEMENT

National Vocational and Technical Training Commission (NAVTTTC) extends its gratitude and appreciation to representatives of business, industry, academia, government agencies, provincial TEVTAs, sector skill councils and trade associations who spared time and extended their expertise for the development of National Vocational Qualifications for the trade of **Mining Process Technology**. This work would not have been possible without the technical support of the above personnel.

NAVTTTC initiated development of CBT&A based qualifications for 200 traditional / hi-tech trades under the Prime **Minister’s Hunarmand Pakistan Program**, focusing on Development & Standardization of 200 Technical & Vocational Education & Training (TVET) Qualifications. NAVTTTC efforts have received full support from the Ministry of Federal Education and Professional Training, which highly facilitated progress under this initiative.

It may not be out of place to mention here that all the experts of Industry, Academia, TVET TEVTAs, BTEs and PVTC work diligently for making this qualification worthy and error free for which all credit goes to them. However, NAVTTTC accepts the responsibility of all the errors and omissions still prevailing in the qualification document.

Development of Skill Standards is a dynamic and ongoing process, and the developed skill standards need periodic review and updating owing to the constant technological advancements, development in scientific knowledge, and growing experience of implementation at the grass root level as well as the demand of industry. NAVTTTC will ensure to keep the qualifications abreast with the changing demands of both national and international job markets.

Executive Director, NAVTTTC



Contents

Introduction	3
Purpose of the Qualification	5
Date of Validation.....	6
Date of Review.....	6
Codes of Qualification	6
Members of Qualification Development Committee	7
Members of Qualification Validation Committee	8
Members of Qualification Review Committee	9
Entry Requirements	9
Regulation of the Qualification and schedule of units	9
Summary of competency standards	10
724MP12A-Competency Standard: Follow Safety Rules at Site	11
Details of competency standards.....	11
724MP12B- Competency Standard: Perform Basic Communication Skills	14
724MP12C-Competency Standard: Demonstrate Basic Numeracy Skills.....	16
724CO08D-Competency Standard: Perform Basic Technical Drawing.....	18
724MP12E-Competency Standard: Perform Basic Bench Work Operations.....	20
724MP12F-Competency Standard: Interpret Topographic Map	23
724MP12G-Competency Standard: Interpret Geological Maps.....	25
724MP12H-Competency Standard: Interpret Mineral Map.....	27
724MP12I-Competency Standard: Perform Basic Electricity Applications	29
724MP12J-Competency Standard: Perform Safe Handling of Explosive Material ..	31
LIST OF TOOLS AND EQUIPMENT	33



Introduction

Mining technology is exploration of valuable mineral/ores like Manganese, Tantalum, Cassiterite, Copper, Tin, Nickel, Bauxite, Iron, Gold, Silver, gems stone and other geological materials on or underneath the surface of earth. Usually, these ore bodies are in the form of lode, vein, seam, reef, or placer deposit. In other words, it is industrial activity that removes rocks from the Earth and processes it to extract valuable minerals for further use. This technology in a wider sense also includes extraction of any non-renewable resource such as petroleum, natural gas, or even water.

Primarily, there are two types of mining methods being used for the extraction of minerals and ores; surface mining and underground mining. The choice of method is largely determined by factors such as depth, geology of the mineral deposit and the cost of equipment.

When evaluating mineral deposits, it is extremely important to keep profit in mind. The total quantity of mineral in a given deposit is referred to as the mineral inventory, but only that quantity which can be mined at a profit is termed ore reserves.

The overall sequence of activities in modern mining is often compared with the five stages in the life of a mine: prospecting, exploration, development, exploitation, and reclamation.

- Prospecting stage; geophysical, geochemical procedures, location of favorable loci (maps, literature, and old mines), air source/aerial photography, airborne geophysics, satellite, surface/ ground geophysics, geology and spot anomaly is evaluated.
- Exploration (Ore body); sample (drilling or excavation), assay, testing analysis, extent, estimation of tonnage and grade, Evaluate deposit: present value, feasibility study.
- Development (Prospect); acquire mining rights (purchase or lease), File environmental impact statement, technology, assessment, permit, Construct access roads, transport system, locate surface plant, construct facilities, excavate deposit (strip or sink shaft).



- Exploitation (Mine); Factors in choice of methods like geologic, geographic, economic, environmental, societal safety, Types of mining methods. Surface: open pit, open cast, etc. Underground: room and pillar, block caving, etc. Monitor costs and economic payback.
- Reclamation (Real estate); Removal of plant and buildings after closure of mining. Reclamation of waste and tailings dumps, Monitoring of discharges.
- National Vocational & Technical Training Commission (NAVTTTC) developed competency standards for Mining Process technology training under National Vocational Qualifications Framework (NVQF). These competency standards have been developed by a Qualification Development Committee (QDC) and validated by the Qualification Validation Committee (QVC) having representation from the leading experts from academia and industry in mining area of the country.



Purpose of the Qualification

The competency based NVQ has been developed to train the unskilled men and women of Pakistan on the technical and entrepreneurial skills to be employed / self-employed and inevitably set sustainable impact on their lives by enhancing their livelihood income.

The purpose of these qualifications is to set professional standards for upcoming experts, who will serve as key elements enhancing quality of Pakistan's mining sector. The specific objectives of developing these qualifications are as under:

- To equip learners with essential safety practices required at mining and technical sites.
- To develop foundational communication and teamwork skills for effective workplace interaction.
- To strengthen basic numeracy and measurement skills relevant to technical operations.
- To provide hands-on experience in reading and creating simple technical and geological drawings.
- To prepare learners to interpret various maps (topographic, geological, mineral) used in exploration and fieldwork.
- To build competencies in performing basic bench work and electrical applications safely and accurately.
- To promote safe handling, storage, and transport of explosive materials under supervision.
- To support entry-level employment in mining, exploration, and related technical fields.
- To foster a safety-first mindset in high-risk environments like mining and construction.
- To lay a foundation for advanced vocational or technical qualifications in mining and geosciences.



Date of Validation

This national vocational qualification (NVQ) has been validated by the Qualifications Development Committee (QDC) in 4th Oct to 8th Oct 2021 and will remain in currency until 10th October 2031

Date of Review

This national vocational qualification (NVQ) has been reviewed by the Qualifications Review Committee (QRC) on 30th June to 3rd July 2025 at NUTECH, Islamabad.

The qualification shall be reviewed after 3 years.

Codes of Qualification	
Qualification Title	Code
National Vocational Certificate Level 2 in Mining Process Technology "Assistant Technician"	724MP12



Members of Qualification Development Committee

The following members participated in the qualification development process on **13 to 17 August 2021 at PITAC, Lahore.**

S#	Name	Designation
1.	Dr. Shahid Tufail Sheikh	Member Science, Ex-Head of MPRC Lahore
2.	Dr. Farhat Yasmeen	Professor, UET Lahore
3.	Dr. Muhammad Naeem Khan	AP, Govt Science College Wahdat Road, Lahore
4.	Dr. Irfan Hafeez	Senior Scientific Officer, PCSIR Lahore
5.	Dr. Asma Sheikh	Scientific Officer, PCSIR Lahore
6.	Dr. Shafia Iftikhar	AP, University of Sahiwal
7.	Muhammad Irfan Zubair	Deputy Director GSP, Lahore
8.	Shahbaz Muhammad	Assistant geophysicist GSP, Lahore
9.	Hafiz Zeeshan Akram	Assistant Director GSP, Lahore
10.	Muhammad Shahzad	Director, NAVTTC, Islamabad
11.	Engr. Saba Sadiq	DACUM FACILITATOR, Islamabad



Members of Qualification Validation Committee

The following members participated in the qualification development process at PITAC, Lahore. **Date: Oct 4th 2021 to Oct 8th 2021**

S#	Name	Designation
1.	Aftab Hussain	DACUM Facilitator/ Principal P-TEVTA Rawalpindi
2.	Dr. Shahid Tufail Sheikh	Member Science, Ex-Head of MPRC Lahore
3.	Dr. Farhat Yasmeen	Professor, UET Lahore
4.	Dr. Muhammad Naeem Khan	AP, Govt Science College Wahdat Road, Lahore
5.	Dr. Irfan Hafeez	Senior Scientific Officer, PCSIR Lahore
6.	Engr. Shafaat Ali	Lecturer (Mining) GCT Khar Bajaur
7.	Engr. M. Muneeb ur Rehman Khan	Measurement Engineer, ACC PVT Ltd
8.	Zeeshan Musadiq	Data Engineer/Mud logger (Geologist) Petro Services
9.	Tariq Mehmoob	In charge Operational Wing PBTE, Lahore
10.	Mr. Tahir Shah	Assistant Secretary TTB Peshawar
11.	Syed Mansoor Ahmed	Assistant Manager IT, NVQF Registry In charge, SBTE Sindh



Members of Qualification Review Committee

The following members participated in the qualification development process at NUTECH, Islamabad. **Date: 30th June 2025 to 3rd July 2025**

S#	Name	Designation
1.	Mr. Samad Khan Kakar	Director, DoE (NESPA)
2.	Mr. Hafeez Ullah	Deputy Director, DoE, (NESPA)
3.	Dr. Habib Ur Rehman Marwat	UET, Peshawar
4.	Mr. Mobin Ul Haq	Wah Nobel
5.	Col. [®] Sherazi	Director, OS Directorate, GHQ
6.	Col. Saad Tajwar	OS Directorate, GHQ
7.	Lt. Col. Fahad	MI Director, GHQ
8.	Maj. Tahir	CIEDO, HQ
9.	Engr. Hamza Khan	FCCL, Wah
10.	Engr. Muhammad Yousuf	Lecturer, NUTECH
11.	Engr. Yasir Ghazi	KP TEVTA
12.	Maj. Omar	OS Directorate
13.	Mr. Imtiaz Ahmed Sial	NAVTTC Hq
14.	Engr. Muhammad Aleem	DD/DACUM, Facilitator

Entry Requirements

- For National Vocational Certificate Level-2 in Mining Process Technology “Assistant Technician”, the entry requirement is **Middle** or Equivalent for admission in formal institute. The entry in informal sector is not prescribed.

Regulation of the Qualification and schedule of units

Not applicable



Summary of competency standards

Sr.No	Competency Standards	NVQF Level	Category	Estimated Contact hr.			Credit hr.
				Th.	Pr.	Total	
Assistant Technician in Mining Process Technology -Level 2							
1.	Follow Safety Rules at Site	2	Generic	9	21	30	3
2.	Perform Basic Communication Skills	2	Generic	9	21	30	3
3.	Demonstrate Basic Numeracy skills	2	Functional	18	42	60	6
4.	Perform Basic Technical Drawing	2	Functional	23	57	80	8
5.	Perform Basic Bench Work Operations at workplace	2	Technical	10	90	100	10
6.	Interpret Topographic Map	2	Technical	7	33	40	4
7.	Interpret Geological Maps	2	Technical	6	24	30	3
8.	Interpret Mineral Map	2	Technical	6	24	30	3
9.	Perform Basic Electricity Applications	2	Technical	16	84	100	10
10.	Perform Safe Handling of Explosive Material	2	Technical	16	84	100	10
Total				120	480	600	60



Details of competency standards

724MP12A-Competency Standard: Follow Safety Rules at Site

Overview: This competency standard covers the skills and knowledge required to follow safety rules at working site. Your underpinning knowledge will be sufficient to provide you the basis for your work.

Competency Units	Performance Criteria
CU1. Maintain occupational safety and health at workplace	You must be able to: P1. Identify basic safety signs and symbols P2. Erect barricades, hoardings, signage in the hazardous areas P3. Maintain housekeeping P4. Report unsafe condition to immediate supervisor (shift position)
CU2. Use Personal Protective and Safety Equipment (PPE)	You must be able to: P1. Identify risk associated with job to be done P2. Select PPE according to job P3. Wear PPE according to job P4. Store PPE at Designated place after use
CU3. Perform Communication Signals	You must be able to: P1. Identify different types of communication hand signals. P2. Use appropriate hand signals as per situation.
CU4. Demonstrate Firefighting exercise	You must be able to: P1. Identify fire types and extinguishers P2. Perform fire alarm response procedure P3. Operate fire extinguishers safely P4. Use firefighting protective equipment (PPE)
CU5. Perform basic rescue/first aid in case of emergency	You must be able to: P1. Check and maintain first aid box essentials P2. Assess emergency situation and ensure scene safety P3. Perform CPR on a man (for demonstration)



	P4. Apply dressings and bandages properly P5. Perform safe lifting and moving techniques (stretcher use)
CU6. Understand basic safety protocols of blasting	You must be able to: P1. Recognize types and purposes of blasting P2. Recognize safety signage and warning signals P3. Identify required PPE P4. Recognize Non sparking tools P5. Use of specified equipment's

Knowledge & Understanding

The student must be able to demonstrate knowledge and understanding required to carry out tasks covered in this competency standards. This includes the knowledge of:

- Types of hazards
- Verbal and non-verbal (Hand Signals) communication
- Basic first aid treatment
- Safety signs and symbols
- Manual handling of loads
- Standard procedure of handling, storing and stacking material.
- Usage of Appropriate PPE for different situations
- Understanding of blasting types, safety signals, required PPE, non-sparking tools, and proper use of specified blasting equipment.

Critical Evidence(s) Required

The candidate needs to produce following critical evidence (s) to be competent in this competency standard:

- Use of PPE according to hazard/job
- Keep the workplace clean and tidy
- Balance the load while handling manually
- Use of first aid kit

Tool & Equipment

- Personal Protective Equipment
- First Aid kit



- Oxygen Cylinder
- Different types of fire extinguishers
- Different types of blasting tools

**724MP12B- Competency Standard: Perform Basic Communication Skills**

Overview: This unit describes the skills and knowledge required to assist in the development of basic communication competence by providing information regarding different forms of communication and their appropriate use. Your underpinning knowledge will be sufficient to provide you the basis for your work.

Competency Units	Performance Criteria
CU1. Communicate in a team	You must be able to: P1. Treat team members with respect Maintain positive relationships to achieve common organizational goals P2. Get work related information from team P3. Identify interrelated work activities to avoid confusion P4. Adopt communication skills, which are designed in a team. P5. Identify problems in communication with a team Resolve Communication barrier through discussion and mutual agreement
CU2. Follow Supervisor's instructions as per organizational SOPs	You must be able to: P1. Receive the instructions from Supervisor P2. Carry out necessary action on the instructions of the supervisor P3. Report to the supervisor as per organizational SOPs
CU3. Report hazard/incident properly	You must be able to: P1. Identify and recognize hazards or incidents P2. Record incident details accurately P3. Notify the appropriate person to report

Knowledge & Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out the tasks covered in this competency



standard. This includes the knowledge of:

- Reporting techniques
- Application of Work ethics
- Good communication skills
- Workplace dress code
- The role of team members and functionality of the teams
- Team dynamics
- Basic Reading Skills
- Basic Writing skills
- Basic Verbal communication skills
- Basic Problem solving skills
- Basic Self-Management Skills
- Basic Technology Skills
- Basic Interview Skills

Tool & Equipment

- Note book
- Pen
- Pencil
- Communication gadgets

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

- Maintain effective communication with colleagues and supervisors
- Prepare different office reports

**724MP12C-Competency Standard: Demonstrate Basic Numeracy Skills**

Overview: This module covers the skills and knowledge required to apply basic numeracy skills, perform measurement, perform basic mathematical calculations and calculate area and Volume of object. Your underpinning knowledge will be sufficient to provide you the basis for your work.

Competency Units	Performance Criteria
CU1. Apply Basic Numeracy Skills	<i>You must be able to:</i> P1. Perform basic mathematical calculations as per given task P2. Perform DMAS rule as per given calculation. P3. Calculate percentages of given task
CU2. Perform Basic Measurement	<i>You must be able to:</i> P1. Collect geometric tools for required measurements P2. Measure length of given object by using standard units P3. Perform inter conversion of Measuring units as per requirement
CU3. Estimate Area and Volume of Object	<i>You must be able to:</i> P1. Calculate Area and Volume of given object P2. Calculate surface area of given object P3. Calculate volume of material in the given object Calculate quantities of materials (stone, aggregate, stacks/piles and sand) by incorporating time saving practices

Knowledge & Understanding

The candidate must be able to demonstrate underpinning knowledge and calculations to carry out tasks covered in this competency standard. This includes the knowledge of:

- Basic principles of addition, subtraction, multiplication and division
- Basic measuring units and its interring conversion



- Calculate area and volume of cylinder and cube
- Time saving practices

Tool & Equipment

- Geometry Box
- Measuring tapes
- Calculator
- Materials of various shapes

Critical Evidence Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

- Perform addition
- Perform subtraction
- Perform multiplication
- Perform division
- Inter conversion of measuring units.
- Calculate Area and Volume of geometrical figures
- Calculate volume of material stacks of various shapes

**724CO08D-Competency Standard: Perform Basic Technical Drawing**

Overview: This competency standard deal with learning the competencies needed to perform basic technical drawing. That includes lettering/lines, different geometrical shapes. It will also allow you to learn orthographic views, dimensioning and drawing symbols. Your underpinning knowledge will be sufficient to provide you the basis for your work.

Competency Units	Performance Criteria
CU.1 Explore Lettering, Lines and symbols	You must be able to: P1. Draw different types of lettering P2. Draw different types of lines P3. Draw different drawing symbols
CU.2 Draw Different Geometrical Shapes	You must be able to: P1. Draw different geometrical figures P2. Draw simple curve P3. Create a pattern with simple shapes
CU.3 Dimension the drawing	You must be able to: P1. Draw different types of dimensions. P2. Draw geometrical tolerance

Knowledge & Understanding

The candidate must be able to demonstrate underpinning knowledge and calculations to carry out tasks covered in this competency standard. This includes the knowledge of:

- Types of orthographic views
- Types of pictorial drawings
- Types of sectional views
- Types of lines
- Types of scales
- Types of dimensioning and drawing symbols
- Types of developmental drawings
- Types of geometrical solids and geometrical figures
- Different types of drawing pencils (Clutch pencil Mechanical pencils, etc.)



- Different types of technical pens
- Different types of ruler
- Different drawing sheets (scholar sheet, chart paper, Canson Sheet, etc.)

Critical Evidence(s) Required

The candidate needs to produce any or all of the following documents/evidences:

- Portfolio
- Draw different geometrical shapes
- Draw first and third angle projection with symbols
- Identify different installation and assembly plans and sections

Tool & Equipment

- Graph and drawing sheet
- Drawing board/table
- T-Square
- Set Square
- Templates
- Compass
- Divider
- Drawing pencils
- Protractor

**724MP12E-Competency Standard: Perform Basic Bench Work Operations**

Overview: This competency standard covers the skills and knowledge required to produce holes using drilling machine, perform counter boring, counter sinking and perform machine reaming.

Competency Units	Performance Criteria
CU1. Assist in Drilling operation	You must be able to: P1. Select drilling bit according to the material P2. Select marking tool and mark the job as per drawing P3. Select clamping device and clamp the work piece P4. Set the machine RPM according to the drill size and work piece material P5. Mark center with the help of center punch P6. Perform drilling as per standard procedures P7. Perform post drilling operations P8. Verify the final job with the given drawing
CU2. Assist Counter Sinking and Counter Boring	You must be able to: P1. Select counter sinking tool according to the drawing P2. Select marking tool and mark the job as per drawing P3. Select clamping device and clamp the work piece P4. Perform drilling operation as per drawing P5. Set the machine RPM according to the counter sink size and work piece material P6. Perform counter sinking as per standard procedures P7. Verify the final job with the given drawing
CU3. Carry out Reaming	You must be able to: P1. Select reamer according to the job specification P2. Select marking tool and mark the job as per drawing P3. Select clamping device and clamp the work piece P4. Perform drilling to produce hole according to the size of reamer P5. Perform reaming as per job specification



	P6. Verify the final job with given drawing
CU4. Perform General Housekeeping & Maintenance	You must be able to: P1. Clean and maintain all workplace tools & machines as per housekeeping checklists or given instructions P2. Prepare checklist for daily cleanliness of the workplace P3. Place all tools & material in proper place to ensure safe work P4. Fill checklists to conduct maintenance and housekeeping of machines & tools
CU5. Perform Benchmark Operation for charge preparation	You must be able to: P1. Collect and transport required tools and materials P2. Assist in cleaning of blast holes P3. Placing of precautionary flags on the blast zone P4. Assist in placing stemming material

Knowledge & Understanding

The candidate must be able to demonstrate underpinning knowledge and calculations to carry out tasks covered in this competency standard. This includes the knowledge of:

- Basic engineering drawings
- Types & application of clamping devices
- Types and uses of basic measuring instruments required during different operations
- Types and uses of layout tools
- Different types of hacksaw blades and its use
- File types and their uses
- Types and application of reamers
- Types & properties of material
- Drilling and its uses.
- Types of drilling tools
- Types and uses of measuring instruments required during grinding operations
- Types of nut and bolts
- Guidelines and checklists to conduct maintenance and



Housekeeping of tools and equipments

- Importance of daily cleanliness of workplace
- Importance of storing tools and material in specific place
- Faulty/damaged/ worn out parts
- Importance of Record keeping
- Utilization of tools (measuring, marking & cutting) equipment and their working method
- Able to mark the blasting area properly
- Knowledge about explosive charging
- Site communication

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

- Produce a component containing the following operations marking, counter sinking and counter boring
- Produce a component containing the following operations with drilling & reaming
- Clean and maintain all bench-work tools and machines as per instructions given
- Interpret guidelines and checklists of conducting housekeeping of machines and tools

Tool & Equipment

- Drilling Machines
- Drill chuck with Key
- Machine Vice
- Marking Tools
- Measuring Tools
- Drill Sleeve and Socket
- Personal Protective Equipment
- Counter drill
- Cutting oil
- Tri square
- Measuring Tool
- Sign flags

**724MP12F-Competency Standard: Interpret Topographic Map**

Overview: This competency standard covers the skills and knowledge required to use grid reference and GPS, illustrate administrative index, locate the specific/required area in sheet and legends of topographic sheet.

Competency Units	Performance Criteria
CU1. Utilize Grid Reference and GPS	You must be able to: P1. Identify the longitude and latitude of given location P2. Locate the given site by GPS (global positioning system). P3. Find directions by Brunton compass. P4. Identify the number of topographic sheets as required P5. Scale topographic sheet as per requirements P6. Identify the values of longitude and latitude of given site P7. Measure distance between two specific points on topographic sheet
CU2. Illustrate Administrative Index	You must be able to: P1. Identify geographical location of topographic sheet P2. Identify number of adjacent topographic sheet P3. Perform illustration for administrative indexing
CU3. Locate The Specific/Required Area in Sheet	You must be able to: P1. Calculate area of ore body P2. Calculate mining area of required location P3. Mark the specific area on sheet
CU4. Setout Legends of Topographic Sheet	You must be able to: P1. Identify the natural and man-made features on topographic sheet P2. Identify water bodies, vegetation cover, agricultural land, mountainous and plain area P3. Identify man-made structures (roads, railway lines, towns etc.) P4. Identify the landforms by reading contours

Knowledge & Understanding



The candidate must be able to demonstrate underpinning knowledge and calculations to carry out tasks covered in this competency standard. This includes the knowledge of:

- Basic geological concept
- Rock type, geomorphology/ landform, mineral,
- Importance of topographic sheet
- Describe topographic sheet
- Administrative index
- Usage of grid reference and GPS
- Legends of topographic sheet

Critical Evidence(s) Required

The candidate needs to produce the following critical evidence(s) in order to be competent in this competency standard:

- Identify and interpret different topographical sheets/maps

Tool & Equipment

- Topographic sheet
- GPS
- Brunton compass
- Plain table
- Stationary items

**724MP12G-Competency Standard: Interpret Geological Maps**

Overview: This competency standard covers the skills and knowledge required to illustrate Rock units, recognize geological structure and geological map symbols.

Competency Units	Performance Criteria
CU1. Illustrate Rock units	You must be able to: P1. Find out geological formation of given rock P2. Recognize age of given rock P3. Understand dip and strike P4. Understand type of lithology (limestone, sandstone, shale etc.) P5. Understand boundaries of different rock units
CU2. Recognize geological structure	You must be able to: P1. Illustrate Fold P2. Identify faults (reverse, normal, strike-slip) P3. Identify joints P4. Identify foliation and lineation P5. Understand anticline syncline
CU3. Illustrate legends	You must be able to: P1. Identify formation legend P2. Identify structure legend P3. Understand lithology legend
CU4. Identify Geological map symbols	You must be able to: P1. Learn dip and strike symbol P2. Identify unconformity symbol P3. Identify fold and fault symbols

Knowledge & Understanding

The student must be able to demonstrate the knowledge and understanding required to carry out tasks covered in this competency standards. This includes the knowledge of:



- Importance of geological maps
- Illustrate Rock units
- Recognizing Geological Structure
- Describe legends
- Geological map symbols

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

- Identify and interpret different geological maps

Tool & Equipment

- Geological map
- Plain table
- Stationary items

**724MP12H-Competency Standard: Interpret Mineral Map**

Overview: This competency standard covers the skills and knowledge required to identify mineral zones, identify different minerals and gemstone.

Competency Units	Performance Criteria
CU1. Identify mineral zones	You must be able to: P1. Understand Sedimentary area P2. Recognize Igneous area P3. Recognize Metamorphic area
CU2. Identify different minerals	You must be able to: P1. Identify sulphide and oxide minerals according to rock form P2. Recognize carbonates P3. Recognize silicates P4. Recognize Phosphates P5. Highlight Native elements (gold, silver etc.)
CU3. Identify gemstone	You must be able to: P1. Recognize emerald, topaz, ruby, sapphire etc. P2. Estimate the hardness of gemstone

Knowledge & Understanding

The student must be able to demonstrate the knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge of:

- Mineral zones
- Different minerals
- Gemstone

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

- Identify and interpret different mineral maps

Tool & Equipment

- Mineral maps



Competency Standards for “Assistant Technician in Mining Process Technology”



- Moh’s hardness tester
- XRF handheld gun
- Plain table
- Stationary items

**724MP12I-Competency Standard: Perform Basic Electricity Applications**

Overview: This competency standard covers the skills and knowledge required to perform basic electrical applications. It covers basic electric circuits, three phase connections, and basic electrical measurements.

Competency Units	Performance Criteria
CU1. Interpret Electrical layout	<i>You must be able to:</i> P1. Interpret layout of the job for installations P2. Interpret electrical drawing for electrical wirings P3. Connect components of equipment according to drawing
CU2. Perform Basic Electric Circuits	<i>You must be able to:</i> P1. Prepare series circuit on work bench P2. Prepare parallel circuit on work bench P3. Prepare Head and Taillight Circuit on work bench P4. Prepare indicator circuit on work bench
CU3. Perform Basic Electrical Measurements	<i>You must be able to:</i> P1. Measure voltage P2. Measure current P3. Measure resistance P4. Perform continuity Test
CU4. Assist in establishing three phase connection	<i>You must be able to:</i> P1. Assist in cable selection P2. Assist in cables colors selection P3. Assistance in connecting cables P4. Insulate Joints

Knowledge & Understanding

The candidate must be able to demonstrate the underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge of:



- Electrical symbols to be used in drawings
- AC and DC
- Ohm’s Law
- Electrical connection scheme of the job
- Handling techniques for placement for electrical equipment
- Different methods of cable testing
- Methods of installing electrical appliances
- Different types of coding procedures (e.g. color coding / tagging / numbering)
- Earthing and testing procedures
- Working principle of earth tester
- L.C.R meter

Tools and Equipment

- Multimeter
- Wires
- Measuring tools
- Supply
- Tester

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

- Basic Electric Circuits
- Three phase connection
- Basic Electrical Measurement

**724MP12J-Competency Standard: Perform Safe Handling of Explosive Material**

Overview: This competency standard covers the skills and knowledge required to perform safe handling of explosive material.

Competency Units	Performance Criteria
CU1. Identify different types of blasting materials	<i>You must be able to:</i> P1. Differentiate between high explosive and accessories P2. Identify blasting materials by their classification P3. Understand the role of explosives & accessories
CU2. Perform safe storage of explosive Material at blasting site	<i>You must be able to:</i> P1. Follow the storage and work instruction P2. Ensure the environmental condition at storage site P3. Store explosive material at designated storage site P4. Perform storage of explosives and accessories separately
CU3. Perform safe handling of explosive materials after transportation	<i>You must be able to:</i> P1. Inspect seal package of explosives and accessories P2. Perform safe transportation of explosives and accessories through approved explosives vans P3. Maintain separation of explosives and accessories
4. Use explosive materials safely	<i>You must be able to:</i> P1. Use required personal protective equipment (PPE) P2. Keep clear from blast zone as per supervisor's instructions P3. Assist in preparing work area to prevent accidents

Knowledge & Understanding

The student must be able to demonstrate knowledge and understanding required to carry out tasks covered in this competency standards. This includes the knowledge of:

- Transportation and storage technique
- Safety factors



Tool & Equipment

- Transportation and storage machines
- Mock explosive material

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

- Perform safe transportation of blasting material
- Perform safe storage of blasting material



LIST OF TOOLS AND EQUIPMENT

Sr.#	Tools & Equipment
1.	Computer Systems
2.	Scanner
3.	Printer
4.	Drilling machine with accessories
5.	Drilling tools (twist drill, center drill, counter boring tool , reamer, taps etc)
6.	Surface Grinding Machine with accessories and consumables
7.	Steel Rules
8.	Tri Square
9.	Vernier Caliper
10.	Thread gauges
11.	Screw pitch gauges
12.	Fillet gauges
13.	Feeler gauges
14.	Set of Adjustable Wrench
15.	Set of Spanners (Open end, Ring)
16.	Pipe wrench
17.	L-key sets
18.	Nose pliers
19.	Grip pliers
20.	Straight peen Hammer
21.	Long nose Tong
22.	Short nose tong
23.	Flat Chisel
24.	Scraper of different shapes
25.	scriber
26.	Hand hacksaw



27.	Diamond hand file set
28.	Riffle hand file set
29.	Needle hand file set
30.	Round hand file
31.	Half round hand file
32.	Triangular hand file
33.	Square hand file
34.	Flat hand file
35.	Drawing board
36.	Mineral maps
37.	Moh’s hardness tester
38.	Plain table
39.	Stationary items
40	Explosive Charge Carriers (e.g., explosive boxes, carrying bags)
41	Multimeter



42.	Wires
43.	Measuring tools
44.	Tester
45	Topographic sheet
46	Brunton compass
47	GPS
48	Measuring Tool
49	Graph and drawing sheet
50	Geometry Box
51	T-Square
52	Set Square
53	Templates
54	Compass
55	Divider
56	Drawing pencils
57	Protractor
58	Measuring tapes
59	Calculator
60	Materials of various Types
61	First Aid Box
62	Oxygen Cylinder
63	Blasting Machine (manual or electric detonator)
64	Timing Devices (for controlled delay blasting)
65	Shot firing cable