



***National Vocational Certificate Level 3 in Mining Process Technology  
(Senior Technician)***



**National Vocational Certificate Level 3 in Mining Process Technology”  
(Senior Technician)**



**(Curriculum)**



## ***National Vocational Certificate Level 3 in Mining Process Technology (Senior Technician)***



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

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## ***National Vocational Certificate Level 3 in Mining Process Technology (Senior Technician)***



### **Introduction**

#### **Definition/Description of training program (Senior Technician)**

Mining sector is one of the booming industries of Pakistan. There is an increasing demand of the Senior Technician. 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 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 NAVTTTC 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 3 in Mining Process Technology (Senior Technician) are as follows:

- Improve the professional competence of mining process
- Capacitate the local community and trainers in modern CBT training, methodologies and processes as envisaged under NVQF
- Provide flexible pathways and progressions in the mining sector
- Enable the trainees to perform their duties in efficient manner
- Establish a standardized and sustainable system of training for Mining Process technology across globe

### **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. Manage Inventory of mine material
2. Develop 3D drawing
3. Develop 2D drawings
4. Perform Basic Computer Operations
5. Perform Conveyor Operations
6. Perform Blasting Operation



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7. Perform Core Drilling for Mining
8. Work in a Team Environment
9. Maintain Safety at Site

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

### **Possible Career paths**

- Senior Technician
- Technician
- Operations Manager
- Mine Manager
- Process Manager
- Production manager
- Maintenance Manager
- Site Manager
- Superintendent



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### **Trainee entry level:**

The entry level for National Vocational Certificate Level 3 in Construction Sector **(Senior Technician)** is given below:

<b>Title</b>	<b>Entry requirements</b>
National Vocational Certificate Level 3 in Mining Process Technology <b>(Senior Technician)</b>	The entry requirement is Level-2 in Mining process Technology “Junior Assistant” in formal institute. The entry in informal sector is not prescribed.

### **Minimum qualification of trainer:**

A. Must be a holder of DAE/Level 5 Diploma in Civil Technology with at least 2 years relevant experience

**OR**

B. B.Sc Engineering Technology (Civil) / B.E Civil /B.Sc Civil Engineering

### **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:

<b>Total</b>	<b>-</b>	<b>600 hours</b>
<b>Theory</b>	<b>-</b>	<b>120hours (20%)</b>
<b>Practical</b>	<b>-</b>	<b>480 hours (80%)</b>

**Proposed Course Duration-6 Months**

### **Sequence of modules:**

<b>Module-1</b> Maintain Safety at Site	<b>Module-3</b> Perform Core Drilling for Mining	<b>Module-5</b> Perform Conveyor Operations
<b>Module-2</b> Work in a Team Environment		<b>Module-4</b> Perform Blasting Operation
<b>Module-6</b> Perform Basic Computer Operations	<b>Module-8</b> Develop 3D drawing	<b>Module-9</b> Manage Inventory of mine material
<b>Module-7</b> Develop 2D drawings		





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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 3									
1	724MP13-A	Maintain Safety at Site	Senior Technician	3	Generic	17	63	80	8
2	724CO09-B	Work in a Team Environment		3	Generic	12	18	30	3
3	724MP13-C	Perform Core Drilling for Mining		3	Technical	17	63	80	8
4	724MP13-D	Perform Blasting Operation		3	Technical	17	63	80	8
5	724MP13-E	Perform Conveyor Operations		3	Technical	6	54	60	6
6	724MP13-F	Perform Basic Computer Operations		3	Generic	20	30	50	5



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7	724MP13-G	Develop 2D drawings		3	Functional	9	71	80	8
8	724MP13-H	Develop 3D drawing		3	Functional	9	71	80	8
9	724MP13-I	Manage Inventory of mine material		3	Technical	13	47	60	6
		<b>Total</b>				<b>120</b>	<b>480</b>	<b>600</b>	<b>60</b>
		<b>Percentage</b>				<b>20</b>	<b>80</b>		



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### Summary – overview of the curriculum

Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
<b>Module 1:</b> Maintain Safety at Site  <b>Aim:</b> After successful completion of this module, the trainee is competent in maintaining safety at site	<b>LU1:</b> Maintain safe work condition at site <b>LU2:</b> Perform fire fighting <b>LU3:</b> Carry out first aid treatment <b>LU4:</b> Perform Basic electrical work safely at workplace	17	63	80
<b>Module 2:</b> Work in a Team Environment  <b>Aim:</b> After successful completion of this module, the trainee is competent in working in a team environment	<b>LU1:</b> Obtain and convey Workplace information <b>LU2:</b> Participate in workplace meetings and discussions <b>LU3:</b> Identify own role and responsibility within team <b>LU4:</b> Support the co-workers	12	18	30



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Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
<b>Module 3:</b> Perform Core Drilling for Mining  <b>Aim:</b> After successful completion of this module, the trainee is competent in performing core drilling for mining	<b>LU1:</b> Prepare drilling site <b>LU2:</b> Handle equipment and materials to pattern <b>LU3:</b> Measure the mud parameters <b>LU4:</b> Perform manual drilling <b>LU5:</b> Perform rotary drilling <b>LU6:</b> Perform reclamation	17	63	80
<b>Module 4:</b> Perform Blasting Operation  <b>Aim:</b> After successful completion of this module, the trainee is competent in performing blasting operation	<b>LU1:</b> Identify the properties of explosives <b>LU2:</b> Prepare layout for blasting <b>LU3:</b> Arrange pre-blast operations <b>LU4:</b> Maintain magazine /kit for blasting process <b>LU5:</b> Set-up blast site <b>LU6:</b> Conduct post blast operations <b>LU7:</b> Detonate site	17	63	80



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Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
<b>Module 5:</b> Perform Conveyor Operations  <b>Aim:</b> After successful completion of this module, the trainee is competent in performing conveyor operations	<b>LU1:</b> Prepare for conveyor operations <b>LU2:</b> Operate conveyor <b>LU3:</b> Carry out maintenance of Conveyor <b>LU4 :</b> Conduct housekeeping activities	6	54	60
<b>Module 6:</b> Perform Basic Computer Operations  <b>Aim:</b> After successful completion of this module, the trainee is competent in performing computer operations	<b>LU1:</b> Perform basic Configuration of Computer System <b>LU2:</b> Create a document using MS word <b>LU3:</b> Prepare Spreadsheet using MS Excel <b>LU4:</b> Prepare a presentation using MS Power Point	20	30	50



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Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
<b>Module 7:</b> Develop 2D drawings  <b>Aim:</b> After successful completion of this module, the trainee is competent in developing 2D drawings	<b>LU1:</b> Develop 2D Objects <b>LU2:</b> Prepare Final Set of 2D Drawings	9	71	80
<b>Module 8:</b> Develop 3D Drawings  <b>Aim:</b> After successful completion of this module, the trainee is competent in developing 3D drawings	<b>LU1:</b> Develop 3D Objects <b>LU2:</b> Manipulate 3D objects using 3D Editing Tools <b>LU3:</b> Render 3D Model	9	71	80



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Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
<b>Module 9:</b> Manage Inventory of Mine Material  <b>Aim:</b> After successful completion of this module, the trainee is competent in managing inventory of mine material	<b>LU1:</b> Maintain the Log Register <b>LU2:</b> Measure the raw material available in the stack yard <b>LU3:</b> Maintain safe storage of mineral material <b>LU4:</b> Inspect mineral material	13	47	60



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### Module 1: Maintain Safety at site

**Objective:** This competency standard covers the skills and knowledge required to maintain safe work condition at site, emergency response activity at site. Your underpinning knowledge will be sufficient to provide you the basis for your work.

**Duration: 80Hours**

**Theory: 17 Hours**

**Practice: 63 Hours**

**Credit Hours: 8**

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
<b>LU 1</b> Maintain safe work condition at site	<b>The trainee will be able to:</b> <ol style="list-style-type: none"> <li>1. Recognize the safety signs and symbols</li> <li>2. Identify potential hazards at work site</li> <li>3. Identify the risk of slip, trip and fall at work place</li> <li>4. Perform fall protection measures as per job</li> </ol>	<ul style="list-style-type: none"> <li>• Describe the safety signs at work place</li> <li>• Demonstrate the fall protection measures</li> <li>• Describe unsafe act and unsafe conditions</li> <li>• Knowledge of hazardous materials and relevant safety procedures</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>• Visit the work site and identify the potential</li> </ul>	<b>Total</b> 26 hrs <b>Theory:</b> 5 hrs <b>Practical:</b> 21 hrs	<div>Consumable</div> <ul style="list-style-type: none"> <li>• Notebooks</li> <li>• Pencils</li> <li>• Erasers</li> <li>• Sharpeners</li> <li>• White board marker</li> <li>• Duster</li> </ul> <div>Non Consumable</div> <ul style="list-style-type: none"> <li>• White board</li> </ul>	<ul style="list-style-type: none"> <li>• Class Room</li> <li>• Simulated environment</li> </ul>





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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	requirements <b>5.</b> Label and store chemicals as per Material Safety Data Sheet (MSDS)	hazards and apply control measures <ul style="list-style-type: none"> <li>Practice to wear full body harness.</li> <li>Sort and label hazardous chemicals at work site</li> </ul>		<ul style="list-style-type: none"> <li>Multimedia</li> <li>Computer</li> </ul>	
<b>LU 2</b> Perform fire fighting	<b>The trainee will be able to:</b> <ol style="list-style-type: none"> <li>Identify source of fire.</li> <li>Identify classes of fire</li> <li>Raise fire alarms</li> <li>Select suitable fire extinguishers</li> <li>Check expiry of fire extinguisher</li> <li>Check wind direction</li> <li>Locate emergency</li> </ol>	<ul style="list-style-type: none"> <li>Describe the fire triangle</li> <li>State principles of fire fighting</li> <li>Describe the source of fire</li> <li>Explain classes of fire</li> <li>Demonstrate firefighting techniques</li> <li>Recognize different types of fire extinguisher</li> </ul> <b>Activity:</b> <ul style="list-style-type: none"> <li>Perform mock exercise of fire fighting on a</li> </ul>	<b>Total</b> 26 hrs <b>Theory:</b> 5 hrs <b>Practical:</b> 21 hrs	<b>Consumable</b> <ul style="list-style-type: none"> <li>Notebooks</li> <li>Pencils</li> <li>Erasers</li> <li>Sharpeners</li> <li>White board marker</li> <li>Duster</li> </ul> <b>Non Consumable</b> <ul style="list-style-type: none"> <li>White board</li> </ul>	<ul style="list-style-type: none"> <li>Class Room</li> <li>Simulated environment</li> </ul>



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	exits <b>8.</b> Perform PASS (Pull, aim, squeeze and sweep) on fire extinguisher	source of fire <ul style="list-style-type: none"> <li>Participate in              emergency response              drill</li> </ul>		<ul style="list-style-type: none"> <li>Multimedia</li> </ul>	
<b>LU 3</b> Carry out first aid treatment	<b>The trainee will be able to:</b> <ol style="list-style-type: none"> <li>Follow COVID-19 SOP's</li> <li>Identify basic elements for first aid kit</li> <li>Maintain a fully stacked first aid kit</li> <li>Check expiry date of medicines</li> <li>Perform mock first aid treatment for minor injuries</li> </ol>	<ul style="list-style-type: none"> <li>Describe the ABC of first aid</li> <li>Describe the first aid procedure for minor cut</li> <li>Describe components of first aid kit</li> </ul> <b>Activity:</b> Demonstrate mock exercise of first aid treatment for minor cut	<b>Total</b> 19 hrs <b>Theory:</b> 4 hrs <b>Practical:</b> 15 hrs	<div>Consumable</div> <ul style="list-style-type: none"> <li>Notebooks</li> <li>Pencils</li> <li>Erasers</li> <li>Sharpeners</li> <li>White board marker</li> <li>Duster</li> </ul> <div>Non Consumable</div> <ul style="list-style-type: none"> <li>White board</li> <li>Multimedia</li> </ul>	<ul style="list-style-type: none"> <li>Class Room</li> <li>Simulated environment</li> </ul>



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				<ul style="list-style-type: none"> <li>Computer</li> </ul>	
<b>LU 4</b>  Perform Basic electrical work safely at workplace	<b>The trainee will be able to:</b> <ol style="list-style-type: none"> <li>1. Check the connectivity of earthing with power equipment</li> <li>2. Check leads and cable for any visual damage before use</li> <li>3. Tag damaged lead, cable and connection points and report to the supervisor</li> </ol>	<ul style="list-style-type: none"> <li>Knowledge of electric hazards</li> <li>Describe protective measures against the electric hazards</li> </ul> <p><b>Activity:</b></p> <p>Practice to check and tag extension leads and cable for any visual damage</p>	<b>Total</b> 9 hrs  <b>Theory:</b> 3 hrs  <b>Practical:</b> 6 hrs	<div>Consumable</div> <ul style="list-style-type: none"> <li>Notebooks</li> <li>Pencils</li> <li>Erasers</li> <li>Sharpeners</li> <li>White board marker</li> <li>Duster</li> </ul> <div>Non Consumable</div> <ul style="list-style-type: none"> <li>White board</li> <li>Multimedia</li> <li>Computer</li> </ul>	<ul style="list-style-type: none"> <li>Class Room</li> <li>Simulated environment</li> </ul>



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### Module 2: Work in a Team Environment

**Objective of the module:** The aim of this module to get knowledge, skills and understanding to work in a team.

**Duration:** 30 Hours

**Theory:** 12 Hours

**Practice:** 18 Hours

**Credit Hours:** 3

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
<b>LU1:</b> Obtain and convey Workplace information	<b>The trainee will be able to:</b> <ol style="list-style-type: none"> <li>1. Assess the specific and relevant information from the appropriate sources</li> <li>2. Convey the information using the appropriate medium and</li> </ol>	<ul style="list-style-type: none"> <li>• Describe the importance of effective communication</li> <li>• State different Sources of information</li> <li>• State different mode of communication</li> <li>• Explain types of non-verbal communication</li> <li>• Explain mode of communication while operating machines</li> <li>• Explain the method of recording the information/instructions.</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>• Role Play each trainee introduce</li> </ul>	<b>Total:</b> 8hrs  <b>Theory:</b> 5hrs  <b>Practical:</b> 3hrs	<div>Consumable</div> <ul style="list-style-type: none"> <li>• Notebooks</li> <li>• Pencils</li> <li>• Erasers</li> <li>• Sharpeners</li> <li>• Pen</li> <li>• White board marker</li> <li>• Duster</li> </ul> <div>Non-Consumable</div> <ul style="list-style-type: none"> <li>• White board</li> <li>• Multimedia</li> <li>• Internet</li> </ul>	<ul style="list-style-type: none"> <li>• Class Room</li> </ul>



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	<p>ideas</p> <p>3. Use appropriate non-verbal communication</p> <p>4. Identify appropriate lines of communication with supervisors and colleagues</p> <p>5. Use the defined workplace procedures for storage of information</p>	<p>himself.</p> <ul style="list-style-type: none"> <li>Convey the job description and company general rules and regulations to fellow workers</li> </ul>		<ul style="list-style-type: none"> <li>Computer system</li> </ul>	



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	6. Inform co-workers and superiors about any deviation				
<b>LU2:</b> Participate in workplace meetings and discussions	<p><b>The trainee will be able to:</b></p> <ol style="list-style-type: none"> <li>Express your own opinions</li> <li>Listen other's point of view without interruption</li> <li>Prepare simple questions about workplace procedures</li> </ol>	<ul style="list-style-type: none"> <li>Describe the protocol of meeting</li> <li>Describe the role and objective of team.</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>Participate in mock meeting for preparation to perform job.</li> </ul>	<p><b>Total:</b>8hrs</p> <p><b>Theory:</b>3hrs</p> <p><b>Practical:</b>5hrs</p>	<p><b>Consumable</b></p> <ul style="list-style-type: none"> <li>Notebooks</li> <li>Pencils</li> <li>Erasers</li> <li>Sharpeners</li> <li>White board marker</li> </ul> <p><b>Non Consumable</b></p> <ul style="list-style-type: none"> <li>White board</li> <li>Multimedia</li> <li>Internet</li> <li>Computer system</li> </ul>	<ul style="list-style-type: none"> <li>Class Room/Lab</li> </ul>



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
<b>LU3:</b> Identify own role and responsibility within team	<p><b>The trainee will be able to:</b></p> <ol style="list-style-type: none"> <li>1. Identify the individual role and responsibilities within the team environment.</li> <li>2. Recognize the roles and responsibility of other team members.</li> <li>3. Report relationships within team and external to team</li> <li>4. Share report</li> </ol>	<ul style="list-style-type: none"> <li>• Describe the importance of creating cooperative work environment</li> <li>• Describe the role and objective of team.</li> <li>• Explain risk of failure team work on the project.</li> <li>• Describe the importance of resolving the co-worker's problems</li> <li>• State plan work and organize required resources in coordination with team</li> </ul> <p><b><u>Activity:</u></b></p> <p>Role Play, get instruction regarding job order from supervisor and convey it to</p>	<p><b>Total:</b>7hrs</p> <p><b>Theory:</b>2hrs</p> <p><b>Practical:</b>5hrs</p>	<p><b>Consumable</b></p> <ul style="list-style-type: none"> <li>• Notebooks</li> <li>• Pencils</li> <li>• Erasers</li> <li>• Sharpeners</li> <li>• White board marker</li> <li>• Duster</li> </ul> <p><b>Non Consumable</b></p> <ul style="list-style-type: none"> <li>• White board</li> <li>• Multimedia</li> <li>• Internet</li> <li>• Computer system</li> </ul>	<ul style="list-style-type: none"> <li>• Class Room</li> </ul>



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	with co-workers.	coworkers according			
<b>LU4:</b> Support the co-workers	<b>The trainee will be able to:</b> <ol style="list-style-type: none"> <li>1. Hand over the required materials and tools timely to interfacing team</li> <li>2. Work together with co-workers in an effective manner.</li> <li>3. Address the problems of co-worker effectively</li> <li>4. Report to immediate boss</li> </ol>	<ul style="list-style-type: none"> <li>Describe the importance of creating cooperative work environment</li> <li>Describe the importance of resolving the co-worker's problems</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>Role Play, Support and guide stressed co worker in his work related activity</li> </ul>	<b>Total:</b> 7hrs  <b>Theory:</b> 2hrs  <b>Practical:</b> 5hrs	<div>Consumable</div> <ul style="list-style-type: none"> <li>Notebooks</li> <li>Pencils</li> <li>Erasers</li> <li>Sharpeners</li> </ul> <div>Non Consumable</div> <ul style="list-style-type: none"> <li>White board</li> <li>Multimedia</li> <li>Internet Computer system</li> </ul>	<ul style="list-style-type: none"> <li>Class Room/Lab</li> </ul>





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### Module 3: Perform Core Drilling for Mining

**Objective of the module:** The aim of this module is to get knowledge, skills and understanding to perform core drilling for mining.

**Duration:** 80Hours

**Theory:** 17 Hours

**Practice:** 63Hours

**Credit Hours:** 8

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
<b>LU1:</b> Prepare drilling site	<b>The trainee will be able to:</b> <ol style="list-style-type: none"> <li>1. Adjust drill within specified tolerances as per drill pattern</li> <li>2. Place indicators on drill pattern in preparation for hole drilling</li> <li>3. Mark out drill pattern</li> <li>4. Protect pre-existing drill holes according to required hole</li> <li>5. Complete required documentation</li> </ol>	<ul style="list-style-type: none"> <li>• Explain the drilling procedure</li> <li>• Understanding of documents required for core drilling</li> </ul> <p><b>Activity:</b> Practice to prepare site for drilling</p>	<p><b>Total:</b> 11hrs.</p> <p><b>Theory:</b> 2 hrs.</p> <p><b>Practical:</b> 9hrs.</p>	<p><b>Consumable</b></p> <ul style="list-style-type: none"> <li>• Notebooks</li> <li>• Pencils</li> <li>• Erasers</li> <li>• Sharpeners</li> <li>• Pen</li> <li>• White board marker</li> <li>• Duster</li> </ul> <p><b>Non Consumable</b></p> <ul style="list-style-type: none"> <li>• White board</li> <li>• Air filter restriction indicator</li> <li>• Cab (horn, lights, air conditioner)</li> <li>• Display instrumentation and gauges (indicators, gauges, laser)</li> </ul>	<ul style="list-style-type: none"> <li>• Class Room/site</li> </ul>



## National Vocational Certificate Level 3 in Mining Process Technology (Senior Technician)



Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
				<p>levels),</p> <ul style="list-style-type: none"> <li>• Engine and stop engine lights (orange and red)</li> <li>• Fluid levels (windscreen washer tank, hydraulic oil, coolant, grease, water, engine oil, fuel)</li> <li>• Visual and audio warning devices and lights</li> <li>• Computer system</li> </ul>	



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
<b>LU2:</b> Handle equipment and materials to pattern	<p><b>The trainee will be able to:</b></p> <ol style="list-style-type: none"> <li>1. Complete pre-operational checks to confirm drill rig for moving to work site</li> <li>2. Confirm route and destination prior to movement of equipment and materials</li> <li>3. Handle transportation of equipment and attachments safely to avoid damaging</li> </ol>	<ul style="list-style-type: none"> <li>• Explain the importance of Material handling</li> </ul> <p><b><u>Activity:</u></b></p> <ul style="list-style-type: none"> <li>• Practice to pre-checking of drilling rig</li> <li>• Practice to alignment of drilling rig</li> <li>• Practice to identify potential hazards</li> <li>• Practice to protect existing drill holes</li> </ul>	<p><b>Total:</b>15hrs</p> <p><b>Theory:</b>3hrs</p> <p><b>Practical:</b>12 hrs</p>	<p><b>Consumable</b></p> <ul style="list-style-type: none"> <li>• Notebooks</li> <li>• Pencils</li> <li>• Erasers</li> <li>• Sharpeners</li> <li>• White board marker</li> <li>• Duster</li> </ul> <p><b>Non Consumable</b></p> <ul style="list-style-type: none"> <li>• White board</li> <li>• Multimedia</li> <li>• Internet</li> <li>• Computer system</li> <li>• Air filter restriction indicator</li> <li>• Cab (horn, lights, air conditioner)</li> <li>• Display instrumentation</li> </ul>	<ul style="list-style-type: none"> <li>• Class Room/site</li> </ul>



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	<p>equipment, site and injury to personnel</p> <p>4. Align drill machine in appropriate position to access drill pattern efficiently</p>			<p>and gauges (indicators, gauges, laser levels),</p> <ul style="list-style-type: none"> <li>• Engine and stop engine lights (orange and red)</li> <li>• Fluid levels (windscreen washer tank, hydraulic oil, coolant, grease, water, engine oil, fuel)</li> <li>• Visual and audio warning devices and lights</li> </ul>	
<p><b>LU3:</b></p> <p>Measure the mud</p>	<p><b>The trainee will be able to:</b></p> <p>1. Measure the viscosity</p>	<ul style="list-style-type: none"> <li>• Knowledge of Mud Parameters</li> <li>• Understanding of viscosity</li> </ul>	<p><b>Theory-3hrs</b></p> <p><b>Practical-9hrs</b></p>	<p><b>Consumable</b></p> <ul style="list-style-type: none"> <li>• Notebooks</li> <li>• Pencils</li> <li>• Erasers</li> </ul>	Class Room/site



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
parameters	of given sample 2. Measure gel strength and PH of given sample	<b>Activity:</b> <ul style="list-style-type: none"> <li>Practice to Measure viscosity , gel strength and pH of mud sample</li> </ul>	<b>Total-12hrs</b>	<ul style="list-style-type: none"> <li>Sharpeners</li> <li>White board marker</li> <li>Duster</li> <li>Non Consumable</li> <li>White board</li> <li>Multimedia</li> <li>Internet</li> <li>Computer system</li> <li>pH meter</li> <li>Viscometer</li> </ul>	



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
<b>LU4:</b> Perform manual drilling	<p><b>The trainee will be able to:</b></p> <ol style="list-style-type: none"> <li>1. Select the area for drilling</li> <li>2. Prepare blasting area for drilling according to safety measures</li> <li>3. Select drill bit and depth according to rock type</li> <li>4. Operate jackhammer and hand held air compressor machine as per requirement</li> <li>5. Perform drilling for mining process as per requirement.</li> </ol>	<ul style="list-style-type: none"> <li>• Knowledge of equipment for manual drilling</li> <li>• Describe procedure of manual drilling</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>• Practice to select drill bit for operation</li> <li>• Practice to perform manual drilling</li> </ul>	<p><b>Theory-3hrs</b></p> <p><b>Practical-12hrs</b></p> <p><b>Total-15hrs</b></p>	<p><b>Consumable</b></p> <ul style="list-style-type: none"> <li>• Notebooks</li> <li>• Pencils</li> <li>• Erasers</li> <li>• Sharpeners</li> <li>• White board marker</li> <li>• Duster</li> </ul> <p><b>Non Consumable</b></p> <ul style="list-style-type: none"> <li>• White board</li> <li>• Multimedia</li> <li>• Internet</li> <li>• Computer system</li> <li>• Drilling equipment and machine</li> <li>• Mechanical tool kit</li> </ul>	Class Room/Site



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
<b>LU5:</b> Perform rotary drilling	<b>The trainee will be able to:</b> <ol style="list-style-type: none"> <li>1. Select drill bit(diamond) for rotary drilling</li> <li>2. Identify size of hole for drilling</li> <li>3. Perform drilling for required area</li> </ol>	<ul style="list-style-type: none"> <li>• Knowledge of equipment for rotary drilling</li> <li>• Describe procedure of rotary drilling</li> </ul> <p><b>Activity:</b></p> <p>Practice to perform rotary drilling</p>	<p><b>Theory-3hrs</b></p> <p><b>Practical-12hrs</b></p> <p><b>Total-15hrs</b></p>	<p><b>Consumable</b></p> <ul style="list-style-type: none"> <li>• Notebooks</li> <li>• Pencils</li> <li>• Erasers</li> <li>• Sharpeners</li> <li>• White board marker</li> <li>• Duster</li> </ul> <p><b>Non Consumable</b></p> <ul style="list-style-type: none"> <li>• White board</li> <li>• Multimedia</li> <li>• Internet</li> <li>• Computer system</li> <li>• Drilling equipment and machine</li> <li>• Mechanical tool kit</li> </ul>	Class Room/Site
<b>LU6:</b> Perform reclamation	<b>The trainee will be able to:</b> <ol style="list-style-type: none"> <li>1. Clear site of debris</li> <li>2. Remove drill rig and</li> </ol>	<ul style="list-style-type: none"> <li>• Explain Reclamation</li> </ul> <p><b>Activity:</b></p> <p>Practice to perform reclamation</p>	<p><b>Theory-3hrs</b></p> <p><b>Practical-9hrs</b></p> <p><b>Total-12hrs</b></p>	<p><b>Consumable</b></p> <ul style="list-style-type: none"> <li>• Notebooks</li> <li>• Pencils</li> <li>• Erasers</li> </ul>	Class Room/Site



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	<p>ancillary services where applicable, to allocated area</p> <p>3. Clean all equipment as required</p> <p>4. Store attachments and ancillary equipment</p> <p>5. Complete all documentation as per given format</p>	process		<ul style="list-style-type: none"> <li>Sharpeners</li> <li>White board marker</li> <li>Duster</li> </ul> <p>Non Consumable</p> <ul style="list-style-type: none"> <li>White board</li> <li>Multimedia</li> <li>Internet</li> <li>Computer system</li> <li>Printer</li> <li>Drilling equipment and machine</li> <li>Mechanical tool kit</li> </ul>	





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### Module 4: Perform Blasting Operation

**Objective of the module:** The aim of this module is to get knowledge, skills and understanding to perform blasting operation

**Duration:** 80 Hours

**Theory:** 17Hours

**Practice:** 63 Hours

**Credit Hours:** 8

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
<b>LU1:</b> Identify the properties of explosives	<p><b>The trainee will be able to:</b></p> <ol style="list-style-type: none"> <li>1. Calculate explosive energy as per Absolute Weight Strength (AWS) and Absolute Bulk Strength (ABS) formulas</li> <li>2. Measure velocity and density of explosive</li> <li>3. Measure detonating pressure</li> </ol>	<ul style="list-style-type: none"> <li>Describe method of calculation of absolute Weight Strength (AWS) , Absolute Bulk Strength (ABS) , velocity , density and detonate pressure</li> <li>Knowledge of explosives properties</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>Practice to calculate Absolute Weight Strength (AWS) , Absolute Bulk Strength (ABS) , velocity , density and detonate pressure</li> </ul>	<p><b>Total:</b>11hrs</p> <p><b>Theory:</b>2hrs</p> <p><b>Practical:</b> 9hrs</p>	<p><b>Consumable</b></p> <ul style="list-style-type: none"> <li>Notebooks</li> <li>Erasers</li> <li>Sharpeners</li> <li>White board marker</li> <li>Duster</li> </ul> <p><b>Non Consumable</b></p> <ul style="list-style-type: none"> <li>White board</li> <li>Multimedia</li> <li>Internet</li> <li>Computer system</li> <li>Detonator/ explosive material</li> </ul>	<ul style="list-style-type: none"> <li>Class Room/site</li> </ul>



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
<b>LU2.</b> Prepare layout for blasting	<b>The trainee will be able to:</b> 1. Prepare a layout for surface blasting as per site 2. Prepare a layout for underground blasting as per site	<ul style="list-style-type: none"> <li>Explain layout for blasting</li> <li>Describe types of layout for blasting</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>Practice to prepare surface blast layout</li> <li>Practice to prepare underground blast layouts</li> </ul>	<b>Total:</b> 11hrs  <b>Theory:</b> 2hrs  <b>Practical:</b> 9hrs	<b>Consumable</b> <ul style="list-style-type: none"> <li>Notebooks</li> <li>Erasers</li> <li>Sharpeners</li> <li>White board marker</li> <li>Duster</li> </ul> <b>Non Consumable</b> <ul style="list-style-type: none"> <li>White board</li> <li>Multimedia</li> <li>Internet</li> <li>Computer system</li> </ul>	Class Room/site
<b>LU3.</b> Arrange pre-blast operations	<b>The trainee will be able to:</b> 1. Conduct rock face preparation for blasting operation 2. Select blasting agents, explosives and equipment	<ul style="list-style-type: none"> <li>Describe pre-blast operation</li> <li>Knowledge of documentation required for pre-blast operation</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>Practice to arrange pre-blast operations</li> </ul>	<b>Total:</b> 15 hrs  <b>Theory:</b> 3 hrs  <b>Practical:</b> 12hrs	<b>Consumable</b> <ul style="list-style-type: none"> <li>Notebooks</li> <li>Erasers</li> <li>Sharpeners</li> <li>White board marker</li> <li>Duster</li> </ul>	Class Room/site



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	3. Conduct equipment pre-start (visual) checks 4. Gain relevant approvals through submitting appropriate documentation and notifications 5. Complete organization of blast on time 6. Check hole depth according to drill plan			Non-Consumable <ul style="list-style-type: none"> <li>• White board</li> <li>• Multimedia</li> <li>• Internet</li> <li>• Computer system</li> <li>• Ancillary equipment (generators, pumps, lights, compressors, cleaning equipment, power tools, hand tools)</li> </ul>	



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
<b>LU4.</b> Maintain magazine /kit for blasting process	<b>The trainee will be able to:</b> <ol style="list-style-type: none"> <li>1. Maintain inventory control systems</li> <li>2. Secure blasting agents and explosives in their packaging to avoid spillage</li> <li>3. Transport blasting agents and explosives to correct location using designated route</li> </ol>	<ul style="list-style-type: none"> <li>• Explain blasting process</li> <li>• Knowledge of transport blasting agents</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>• Practice to maintain magazine /kit for blasting process</li> </ul>	<b>Total:</b> 15 hrs  <b>Theory:</b> 3hrs  <b>Practical:</b> 12hrs	<p><b>Consumable</b></p> <ul style="list-style-type: none"> <li>• Notebooks</li> <li>• Erasers</li> <li>• Sharpeners</li> <li>• White board marker</li> <li>• Duster</li> </ul> <p><b>Non-Consumable</b></p> <ul style="list-style-type: none"> <li>• White board</li> <li>• Multimedia</li> <li>• Internet</li> <li>• Computer system</li> <li>• Ancillary equipment (generators, pumps, lights,</li> </ul>	Class Room/site



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
				compressors, cleaning equipment, power tools, hand tools)	
<b>LU5.</b> Set-up blast site	<b>The trainee will be able to:</b> <ol style="list-style-type: none"> <li>1. Erect physical barricades and signage</li> <li>2. Primer, load, stem and tie-in holes according to blast plan</li> <li>3. Return unused explosives and materials to store</li> </ol>	<ul style="list-style-type: none"> <li>• Describe blasting agents</li> <li>• Explain procedure of setting-up Blast site</li> </ul> <p><b><u>Activity:</u></b></p> <ul style="list-style-type: none"> <li>• Practice to prepare blast site</li> <li>• Practice to demonstrate blasting agents</li> </ul>	<b>Total:</b> 8hrs  <b>Theory:</b> 2 hrs  <b>Practical:</b> 6hrs	<div>Consumable</div> <ul style="list-style-type: none"> <li>• Notebooks</li> <li>• Erasers</li> <li>• Sharpeners</li> <li>• White board marker</li> <li>• Duster</li> </ul> <div>Non-Consumable</div> <ul style="list-style-type: none"> <li>• White board</li> <li>• Multimedia</li> <li>• Internet</li> <li>• Computer</li> </ul>	Class Room/site



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
				<p>system</p> <ul style="list-style-type: none"> <li>Ancillary equipment (generators, pumps, lights, compressors, cleaning equipment, power tools, hand tools)</li> <li>Clearance and safety tools</li> </ul>	



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
<b>LU6.</b> Conduct post blast operations	<b>The trainee will be able to:</b> <ol style="list-style-type: none"> <li>1. Locate and dispose misfires</li> <li>2. Flag large rocks for further fragmentation</li> <li>3. Record blast outcomes indicating successes, misfires and general blast results</li> <li>4. Perform general house keeping</li> </ol>	Describe post blast activities <b>Activity:</b> <ul style="list-style-type: none"> <li>• Practice to conduct site inspection</li> <li>• Practice to manage post blast activities</li> </ul>	<b>Total:</b> 8hrs  <b>Theory:</b> 2 hrs  <b>Practical:</b> 6hrs	<b>Consumable</b> <ul style="list-style-type: none"> <li>• Notebooks</li> <li>• Erasers</li> <li>• Sharpeners</li> <li>• White board marker</li> <li>• Duster</li> </ul> <b>Non-Consumable</b> <ul style="list-style-type: none"> <li>• White board</li> <li>• Multimedia</li> <li>• Internet</li> <li>• Computer system</li> <li>• Ancillary equipment</li> <li>• Generators,</li> <li>• Lights,</li> <li>• Compressor,</li> <li>• Cleaning equipment</li> </ul>	Class Room/site
<b>LU7.</b> Perform Detonation	<b>The trainee will be able to:</b> <ol style="list-style-type: none"> <li>1. Conduct detonation at scheduled time</li> <li>2. Achieve blast design</li> </ol>	<ul style="list-style-type: none"> <li>• Describe detonation site</li> <li>• Explain types of detonation</li> </ul> <b>Activity:</b>	<b>Total:</b> 15hrs  <b>Theory:</b> 3 hrs	<b>Consumable</b> <ul style="list-style-type: none"> <li>• Notebooks</li> <li>• Erasers</li> <li>• Sharpeners</li> </ul>	Class Room/site



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	<p>outcomes including desirable fragmentation, appropriate heave and minimum dilution</p> <p>3. Minimize damage to surrounding site and blast area</p>	<ul style="list-style-type: none"> <li>Practice to conduct detonation</li> </ul>	<p><b>Practical:</b> 12hrs</p>	<ul style="list-style-type: none"> <li>White board marker</li> <li>Duster</li> <li>Non-Consumable</li> <li>White board</li> <li>Multimedia</li> <li>Internet</li> <li>Computer system</li> <li>Blasting machines and tools</li> </ul>	





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### Module 5- Perform Conveyor Operations

**Objective of the module:** The aim of this module is to get knowledge, skills and understanding to perform conveyor operations.

**Duration:** 60 Hours

**Theory:** 06 Hours

**Practice:** 54 Hours

**Credit Hours:** 06

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Prepare for conveyor operations	<b>The trainee will be able to:</b> <ol style="list-style-type: none"> <li>Identify the production requirement</li> <li>Identify potential hazards and ground conditions</li> <li>Select PPEs</li> </ol>	<ul style="list-style-type: none"> <li>Describe mine material transportation</li> <li>Knowledge of potential hazards at mining sites</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>Practice to identify production requirement</li> <li>Practice to identify hazards</li> </ul>	<p><b>Total:</b> 7hrs</p> <p><b>Theory:</b> 1 hrs</p> <p><b>Practical:</b> 6hrs</p>	<p><b>Consumable</b></p> <ul style="list-style-type: none"> <li>Notebooks</li> <li>Pencils</li> <li>Erasers</li> <li>Sharpeners</li> <li>White board marker</li> <li>Duster</li> </ul> <p><b>Non Consumable</b></p> <ul style="list-style-type: none"> <li>White board</li> <li>Multimedia</li> <li>Internet</li> <li>Computer system</li> </ul>	<ul style="list-style-type: none"> <li>Class Room/ workshop</li> </ul>



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
				<ul style="list-style-type: none"> <li>PPEs</li> </ul>	
<b>LU2:</b> Operate conveyor	<p><b>The trainee will be able to:</b></p> <ol style="list-style-type: none"> <li>Identify the activities before ,during and on completion of work</li> <li>Carry out start - up and shut down procedure</li> <li>Activate audio and visual safety indicators before conveyor operation commences</li> <li>Monitor equipment performance utilizing appropriate indicators to aid efficient operations</li> <li>Assess weight and dimension of materials</li> </ol>	<ul style="list-style-type: none"> <li>Explain working of audio and safety indicators</li> <li>Knowledge of conveyor operation</li> <li>Describe types of conveyor</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>Practice to transfer mine material</li> <li>Practice to operate conveyor</li> </ul>	<p><b>Total:</b> 23hrs</p> <p><b>Theory:</b>2hrs</p> <p><b>Practical:</b>21hrs</p>	<p><b>Consumable</b></p> <ul style="list-style-type: none"> <li>Notebooks</li> <li>Pencils</li> <li>Erasers</li> <li>Sharpeners</li> <li>White board marker</li> <li>Duster</li> </ul> <p><b>Non Consumable</b></p> <ul style="list-style-type: none"> <li>White board</li> <li>Multimedia</li> <li>Internet</li> <li>Computer system</li> <li>Conveyor</li> </ul>	Class Room/ workshop



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	6. Complete work according to approved work plan and outcomes 7. Check smooth running of conveyor belt system as per given site 8. Monitor conveying process to ensure that spillage is minimized			belt and component • Visual and audio warning devices and lights	
<b>LU3:</b> Carry out maintenance of Conveyor	<b>The trainee will be able to:</b> 1. Identify routine maintenance tasks 2. Conduct inspection and find faults 3. Prepare maintenance record	• Describe importance of routine maintenance of conveyor • Understanding of different faults in conveyor • Knowledge of record maintenance <u><b>Activity:</b></u> • Practice to conduct	<b>Total:</b> 17hrs  <b>Theory:</b> 2hrs  <b>Practical:</b> 15hrs	<b>Consumable</b> • Notebooks • Pencils • Erasers • Sharpeners • White board marker • Duster  <b>Non</b>	• Class Room/ workshop



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
		inspection and find faults • Practice to prepare maintenance record		<b>Consumable</b> • White board • Multimedia • Internet • Computer system • Conveyor belt and component • Visual and audio warning devices and lights	



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
<b>LU4:</b> Conduct housekeeping activities	<b>The trainee will be able to:</b> <ol style="list-style-type: none"> <li>1. Remove all debris from the operation site</li> <li>2. Maintain conveyor equipment after operation</li> <li>3. Complete all documentation as per given format</li> </ol>	<ul style="list-style-type: none"> <li>• Explain methods use for housekeeping activities</li> <li>• Knowledge of documentation required for housekeeping</li> </ul> <p><b>Activity:</b> Practice to conduct housekeeping</p>	<p><b>Total:</b> 13hrs</p> <p><b>Theory:</b> 1hrs</p> <p><b>Practical:</b> 12hrs</p>	<p><b>Consumable</b></p> <ul style="list-style-type: none"> <li>• Notebooks</li> <li>• Pencils</li> <li>• Erasers</li> <li>• Sharpeners</li> <li>• Whiteboard marker</li> <li>• Duster</li> </ul> <p><b>Non Consumable</b></p> <ul style="list-style-type: none"> <li>• White board</li> <li>• Multimedia</li> <li>• Internet</li> <li>• Computer system</li> <li>• Conveyor belt and component</li> <li>• Visual and audio warning devices and lights</li> </ul>	<ul style="list-style-type: none"> <li>• Class Room/ workshop</li> </ul>



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### Module 6- Perform Basic Computer Operations

**Objective of the module:** The aim of this module is to get knowledge, skills and understanding to perform basic computer operations.

**Duration:** 50 Hours

**Theory:** 20Hours

**Practice:** 30 Hours

**Credit Hours:** 5

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1:Perform basic Configuration of Computer System	<p><b>The trainee will be able to:</b></p> <ol style="list-style-type: none"> <li>1. Connect computer components and peripherals as per requirement</li> <li>2. Install drivers and applications according to the software specification</li> <li>3. Troubleshoot applications to trace and fix faults in a specific application to bring it in a running condition</li> </ol>	<ul style="list-style-type: none"> <li>• Knowledge of different computer components. .</li> <li>• Explain operating systems</li> <li>• Differentiate Hardware and Software</li> <li>• Describe the process of troubleshooting of application software</li> </ul> <p><b><u>Activity:</u></b></p> <ul style="list-style-type: none"> <li>• Practice of installing operating system.</li> <li>• Practice of installing Microsoft Office.</li> <li>• Practice of printer and scanner installation.</li> </ul>	<p><b>Total:</b> 11hrs</p> <p><b>Theory:</b> 05hrs</p> <p><b>Practical:</b> 06hrs</p>	<p><b>Consumable</b></p> <ul style="list-style-type: none"> <li>• Notebooks</li> <li>• Pencils</li> <li>• Erasers</li> <li>• Sharpeners</li> <li>• White board marker</li> <li>• Duster</li> </ul> <p><b>Non Consumable</b></p> <ul style="list-style-type: none"> <li>• White board</li> <li>• Multimedia</li> <li>• Internet</li> <li>• Computer</li> </ul>	<ul style="list-style-type: none"> <li>• Computer Lab</li> </ul>



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
				system <ul style="list-style-type: none"> <li>• Pen</li> <li>• Operating system CD</li> <li>• Software and peripheral driver CD</li> </ul>	
<b>LU2:</b> Create a document using MS word	<b>The trainee will be able to:</b> <ol style="list-style-type: none"> <li>1. Compose a document as per the requirement</li> <li>2. Format Word Document according to requirements given</li> <li>3. Print Word Documents according to requirements</li> </ol>	<ul style="list-style-type: none"> <li>• Describe the page set up and paragraph for formatting.</li> <li>• Describe the font size and style.</li> <li>• Knowledge of short keys</li> <li>• Explain printing and type of printers.</li> </ul> <p><b><u>Activity:</u></b></p> <ul style="list-style-type: none"> <li>• Practice of short keys, document opening/closing, saving, coping and pasting.</li> <li>• Practice of creating and editing a</li> </ul>	<b>Total:</b> 14hrs  <b>Theory:</b> 05hrs  <b>Practical:</b> 09hrs	<b>Consumable</b> <ul style="list-style-type: none"> <li>• Notebooks</li> <li>• Pencils</li> <li>• Erasers</li> <li>• Sharpeners</li> <li>• White board marker</li> <li>• Duster</li> </ul> <b>Non Consumable</b> <ul style="list-style-type: none"> <li>• White board</li> </ul>	<ul style="list-style-type: none"> <li>• Computer Labs</li> </ul>



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
		document/letter in MS word and print it.		<ul style="list-style-type: none"> <li>Multimedia</li> <li>Internet</li> <li>Computer system</li> <li>Software CD</li> </ul>	
LU3:Prepare Spreadsheet using MS Excel	<b>The trainee will be able to:</b> <ol style="list-style-type: none"> <li>Create worksheet as per given data</li> <li>Format the worksheet according to given criteria</li> <li>Apply formulas according to the requirement</li> <li>Generate Charts/Graphs according to the given data</li> <li>Print Worksheet according to requirements</li> </ol>	<ul style="list-style-type: none"> <li>Explain different types of formulas in MS Excel</li> <li>Describe short Keys MS Excel</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>Develop a practice to develop a work sheet as per given data</li> <li>Format and apply a formula to a work sheet according to the requirement.</li> </ul> <p>Practice to generate chart/graph according to given data.</p>	<b>Total:</b> 14hrs  <b>Theory:</b> 05hrs  <b>Practical:</b> 09hrs	<div>Consumable</div> <ul style="list-style-type: none"> <li>Notebooks</li> <li>Pencils</li> <li>Erasers</li> <li>Sharpeners</li> <li>Pen</li> <li>White board marker</li> </ul> <div>Non Consumable</div> <ul style="list-style-type: none"> <li>White board</li> <li>Multimedia</li> <li>Internet</li> </ul>	<ul style="list-style-type: none"> <li>Computer Lab</li> </ul>





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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
				<ul style="list-style-type: none"> <li>Computer system</li> <li>MS Office Software</li> </ul>	
<b>LU4:</b> Prepare a presentation using MS Power Point	<b>The trainee will be able to:</b> <ol style="list-style-type: none"> <li>1. Insert slides with different layouts according to requirements of presentation.</li> <li>2. Insert text, tables, images, etc. according to the requirement.</li> <li>3. Apply a set of effects to animate the slide according to requirement.</li> <li>4. Apply slide transitions on slides according to requirement.</li> <li>5. Apply sound effects</li> </ol>	<ul style="list-style-type: none"> <li>Explain types of presentation format</li> <li>Describe short Keys of MS power point</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>Practice of inserting slides different layout according to the requirement of presentation.</li> <li>Practice of inserting text, tables, images into the slides.</li> </ul> <p>Practice of applying effects, slide transition and sound effects according to requirement.</p>	<b>Total:</b> 11hrs  <b>Theory:</b> 05hrs  <b>Practical:</b> 06hrs	<div>Consumable</div> <ul style="list-style-type: none"> <li>Notebooks</li> <li>Pencils</li> <li>Erasers</li> <li>Sharpeners</li> <li>White board marker</li> </ul> <div>Non Consumable</div> <ul style="list-style-type: none"> <li>White board</li> <li>Multimedia</li> <li>Internet</li> <li>Computer system</li> </ul>	<ul style="list-style-type: none"> <li>Computer Lab</li> </ul>



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
	on objects/text/images according to requirement.			<ul style="list-style-type: none"> <li>• Printer</li> <li>• MS Office Software</li> </ul>	



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### Module7- Develop 2D Drawings

**Objective of the module:** The aim of this module to get knowledge, skills and understanding to develop 2D drawings.

**Duration:** 80 Hours

**Theory:** 09 Hours

**Practice:** 71 Hours

**Credit Hours:** 08

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1.Draw 2D shapes	<b>Trainee will be able to:</b> <ol style="list-style-type: none"> <li>1. Setup user interface settings for required drawing.</li> <li>2. Create different 2D shapes with given measurements.</li> <li>3. Edit different 2D shapes to meet requirement.</li> <li>4. Insert dimensions and symbols as per requirement</li> <li>5. Save the file in different drawing formats</li> </ol>	<ul style="list-style-type: none"> <li>• Explain import export of drawing sketch in different formats in CAD Software</li> <li>• Explain 2D setup</li> <li>• Functions of Creating and Editing tools</li> <li>• Dimensions and Symbols</li> <li>• Different file extensions for saving files (JPEG, PDF, etc.)</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>• Draw and practice of different drawings related to mining</li> </ul>	<p><b>Total:</b> 38hrs  <b>Theory:</b> 05hrs  <b>Practical:</b> 33hrs</p>	<p><b>Consumable</b></p> <ul style="list-style-type: none"> <li>• Notebooks</li> <li>• Pencils</li> <li>• Erasers</li> <li>• Sharpeners</li> <li>• White Board marker</li> <li>• Duster</li> <li>• USB</li> </ul> <p><b>Non Consumable</b></p> <ul style="list-style-type: none"> <li>• White board</li> <li>• Multimedia</li> <li>• Internet</li> <li>• Computer system</li> <li>• Printer</li> </ul>	Computer Lab



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Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
<b>LU2.</b> Prepare final sets of 2D drawings	<b>Trainee will be able to:</b> <ol style="list-style-type: none"> <li>1. Develop 2D Drawing with given project specification and measurements.</li> <li>2. Plot drawing on scale according to required size &amp; orientation</li> </ol>	<ul style="list-style-type: none"> <li>• Knowledge of scale and unit</li> <li>• Procedure to prepare 2D drawing according to given scale</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>• Draw and practice a layout of different civil structures</li> </ul>	<p><b>Total:</b>42hrs  <b>Theory:</b>04hrs  <b>Practical:</b>38hrs</p>	<div>Consumable</div> <ul style="list-style-type: none"> <li>• Notebooks</li> <li>• Pencils</li> <li>• Erasers</li> <li>• Sharpeners</li> <li>• White Board marker</li> <li>• Duster</li> <li>• USB</li> </ul> <div>Non Consumable</div> <ul style="list-style-type: none"> <li>• White board</li> <li>• Multimedia</li> <li>• Internet</li> <li>• Computer system</li> <li>• Printer</li> </ul>	Computer Lab



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### Module 8- Develop 3D Drawings

**Objective:** This competency standard covers the skills and knowledge required to develop 3D drawings.

**Duration:** 80Hours

**Theory:** 09Hours

**Practice:** 71Hours

**Credit Hours:** 08

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
<b>LU1.</b>  Develop 3D objects	<b>Trainee will be able to:</b>  1. Setup 3D user interface settings for required drawing.  2. Create different 3D objects with given measurements.	<ul style="list-style-type: none"> <li>3D modelling in AutoCAD               <ul style="list-style-type: none"> <li>3D solids</li> <li>surfaces</li> <li>meshes</li> <li>Wireframe objects</li> <li>Difference between Surface Modelling and Solid Modelling</li> </ul> </li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>Draw and practice 3D views of different Beams using Auto CAD.</li> </ul>	<b>Total:</b> 21hrs <b>Theory:</b> 03hrs <b>Practical:</b> 18hrs	<div>Consumable</div> <ul style="list-style-type: none"> <li>Notebooks</li> <li>Pencils</li> <li>Erasers</li> <li>Sharpeners</li> <li>White Board marker</li> <li>Duster</li> <li>USB</li> </ul> <div>Non Consumable</div> <ul style="list-style-type: none"> <li>White board</li> <li>Multimedia</li> <li>Internet</li> <li>Computer system</li> </ul>	Computer Lab



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				<ul style="list-style-type: none"> <li>Printer</li> </ul>	
<b>LU2.</b> Manipulate 3D objects using 3D Editing Tools	<b>Trainee will be able to:</b> <ol style="list-style-type: none"> <li>Modify 3D objects in line with the requirements.</li> <li>Make customised 3D models according to the requirement of given job.</li> <li>Generate orthographic views from 3D model</li> <li>Generate sectional/auxiliary views from 3D model as per requirement</li> </ol>	<ul style="list-style-type: none"> <li>Boolean operation on 3D solid model               <ul style="list-style-type: none"> <li>Subtraction</li> <li>Intersection</li> <li>Union</li> </ul> </li> <li>3D Navigate control               <ul style="list-style-type: none"> <li>Pre-set views such as isometric, top, bottom, front, left, etc.</li> <li>Perspective projection and parallel projection</li> <li>Constrained Orbit</li> </ul> </li> <li>Insertion of Standard parts from CAD library</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>Import and extrude any 2D drawing into 3D view.</li> </ul>	<b>Total:20hrs</b> <b>Theory:03hrs</b> <b>Practical:17hrs</b>	<p><b>Consumable</b></p> <ul style="list-style-type: none"> <li>Notebooks</li> <li>Pencils</li> <li>Erasers</li> <li>Sharpeners</li> <li>White Board marker</li> <li>Duster</li> <li>USB</li> </ul> <p><b>Non Consumable</b></p> <ul style="list-style-type: none"> <li>White board</li> <li>Multimedia</li> <li>Internet</li> <li>Computer system</li> <li>Printer</li> </ul>	Computer Lab
<b>LU3.</b>  Render 3D Model	<b>Trainee will be able to:</b> <ol style="list-style-type: none"> <li>Apply material to required 3D Model as per given specification</li> </ol>	<ul style="list-style-type: none"> <li>Rendering tools and commands</li> <li>Material and light control</li> <li>Procedure to apply</li> </ul>	<b>Total:42hrs</b> <b>Theory:03hrs</b> <b>Practical:381hrs</b>	<p><b>Consumable</b></p> <ul style="list-style-type: none"> <li>Notebooks</li> <li>Pencils</li> <li>Erasers</li> </ul>	Computer Lab



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	<p>2. Render and print the 3D model according to required size &amp; orientation.</p> <p>3. Apply material texture to 3D model as per requirement.</p>	<p>material textures</p> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>Practice to import and render any 3D view.</li> </ul>		<ul style="list-style-type: none"> <li>Sharpeners</li> <li>White board marker</li> <li>Duster</li> <li>Rebars</li> <li>Chalk</li> <li>Non Consumable</li> <li>White board</li> <li>Multimedia</li> <li>Internet</li> <li>Computer system</li> <li>Mineral maps</li> <li>Moh's hardness tester</li> <li>XRF handheld gun</li> <li>Plain table</li> </ul>	
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### Module 9- Manage Inventory of Mine Material

**Objective:** The aim of this module is to get knowledge, skills and understanding to manage inventory of mine material.

**Duration:** 60 Hours

**Theory:** 13 Hours

**Practice:** 47 Hours

**Credit Hours:** 06

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
<b>LU1.</b>  Maintain the Log Register	<b>Trainee will be able to:</b> <ol style="list-style-type: none"> <li>1. Manage the Log Register on daily basis</li> <li>2. Enter the data corresponding to every type of raw material</li> <li>3. Audit the Log register with on the site materials</li> <li>4. Report to the in charge in case any issues are found</li> <li>5. Prepare the production / dispatch record sheet</li> </ol>	<ul style="list-style-type: none"> <li>• Knowledge about the safety of aggregates against the weather and dust</li> <li>• Explain the importance of gradation of aggregates</li> <li>• Define flaky and elongated aggregates</li> <li>• Describe site material characteristics</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>• Practice of maintaining log register on daily bases.</li> </ul>	<b>Total:</b> 22 hrs  <b>Theory:</b> 4 hrs  <b>Practical:</b> 18hrs	<div style="background-color: #d3d3d3; padding: 2px;">Consumable</div> <ul style="list-style-type: none"> <li>• Notebooks</li> <li>• Erasers</li> <li>• Sharpeners</li> <li>• White board marker</li> <li>• Duster</li> <li>• Material Log register</li> </ul> <div style="background-color: #d3d3d3; padding: 2px;">Non</div> <div style="background-color: #d3d3d3; padding: 2px;">Consumable</div> <ul style="list-style-type: none"> <li>• White board</li> </ul>	Class Room / Site





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		<ul style="list-style-type: none"> <li>Practice of cross checking available material with log register.</li> <li>Practice of generating report in case of any deficiency.</li> </ul>		<ul style="list-style-type: none"> <li>Multimedia</li> <li>Internet</li> <li>Computer system</li> </ul>	
<b>LU2.</b>  Measure the raw material available in the stack yard	<b>Trainee will be able to:</b> <ol style="list-style-type: none"> <li>Calculate amount of material available on site</li> <li>Cross check with the log register</li> <li>Adjust the demands in accordance with the available raw materials</li> <li>Manage the production plan accordingly</li> </ol>	<ul style="list-style-type: none"> <li>Explain types of Aggregates</li> <li>Describe classification of aggregates according to nature of size and shape</li> <li>Explain characteristics of graded fine and coarse aggregates</li> <li>Describe principles of safe and efficient storage</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>Practice of calculating the amount of material available on site.</li> <li>Practice of adjusting demands in accordance with</li> </ul>	<b>Total:</b> 17 hrs  <b>Theory:</b> 5hrs  <b>Practical:</b> 12 hrs	<div>Consumable</div> <ul style="list-style-type: none"> <li>Notebooks</li> <li>Erasers</li> <li>Sharpeners</li> <li>White board marker</li> <li>Duster</li> <li>Material Log register</li> </ul> <div>Non Consumable</div> <ul style="list-style-type: none"> <li>White board</li> <li>Multimedia</li> <li>Internet</li> <li>Computer</li> </ul>	Class Room/ Site



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		available raw material.		system	
<b>LU3.</b> Maintain safe storage of mineral material	<b>Trainee will be able to:</b> <ol style="list-style-type: none"> <li>1. Dump materials as per graded sizes</li> <li>2. Check materials quality &amp; quantity visually as per standard procedures</li> <li>3. Maintain the log book of materials In/Out</li> </ol>	<ul style="list-style-type: none"> <li>Describe moisture of aggregates</li> <li>Knowledge about safety of aggregates against the weather and dust</li> <li>Describe the importance of gradation of aggregates</li> </ul> <p><b>Activity:</b></p> <ul style="list-style-type: none"> <li>Practice of dumping material as per graded sizes.</li> <li>Practice of checking material quality and quantity as per standards.</li> <li>Practice of maintaining log book of material</li> </ul>	<p><b>Total:</b>21hrs</p> <p><b>Theory:</b>4hrs</p> <p><b>Practical:</b>17hrs</p>	<p><b>Consumable</b></p> <ul style="list-style-type: none"> <li>Notebooks</li> <li>Erasers</li> <li>Sharpeners</li> <li>White board marker</li> <li>Material Log register</li> </ul> <p><b>Non Consumable</b></p> <ul style="list-style-type: none"> <li>White board</li> <li>Multimedia</li> <li>Internet</li> <li>Computer system</li> </ul>	<ul style="list-style-type: none"> <li>Class Room / Site</li> </ul>



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**List of Tool, Machinery, Equipment and Consumables:**

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



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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.	Log Books
22.	Application Software
23.	Internet router
24.	Spatula
25.	Various hand / power tools
26.	Stretcher
27.	Engine and stop engine lights (orange and red)
28.	Display instrumentation and gauges (indicators, gauges, laser levels), computer systems
29.	Fluid levels (windscreen washer tank, hydraulic oil, coolant, grease, water, engine oil, fuel)



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30.	Visual and audio warning devices and lights
31.	Viscometer
32.	Air filter restriction indicator
33.	Mechanical tool kit
34.	Drilling equipment and machine
35.	Blasting machine and tools
36.	Ancillary equipment (generators, pumps, lights, compressors, cleaning equipment, power tools, hand tools)
37.	pH meter
38.	Visual and audio warning devices and lights
39.	Calculator
40.	Conveyor belt and component
41.	Inventory register
42.	Screw driver set



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43.	Plier
44.	Slip joint plier
45.	Socket set
46.	Hand hacksaw
47.	Chisel
48.	Tong
49.	Claw hammer
50.	Ball peen Hammer
51.	Straight peen Hammer
52.	Grip pliers
53.	Nose pliers
54.	L-key sets
55.	Pipe wrench



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56.	Set of Spanners (Open end, Ring)
57.	Set of Adjustable Wrench
58.	Dial Bore Gauge
59.	Snap Gauge set
60.	Micrometer
61.	Feeler gauges
62.	Screw pitch gauges
63.	Thread gauges
64.	Vernier Caliper
65.	Tri Square
66.	Steel Rules
67.	Hoppers
68.	Conveyors





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**Members of the Curriculum Development Committee**

S#	Name	Designation
1.	Saima Asghar	DACUM Facilitator, Lahore
2.	Engr. M. Muneeb Ur Rehman Khan	Measurement Engineer, ACC pvt Ltd
3.	Dr. Muhammad Naeem Khan	AP, Govt Science College Wahdat Road, Lahore
4.	Dr. Farhat Yasmeen	Professor, UET Lahore
5.	Dr. Irfan Hafeez	Senior Scientific Officer, PCSIR Lahore
6.	Dr. Shahid Tufail Sheikh	Member Science(Retired), Ex-Head of MPRC Lahore
7.	Dr. Asma Sheikh	Scientific Officer, PCSIR Lahore
8.	Mohammad Shahbaz	Assistant Director, Mining Development Cell, Lahore
9.	Syed Zafar Ayab Hussain Shah	Project Coordinator, ZKB Construction ,Peshawar
10.	Muhammad Irfan Zubair	Deputy Director GSP, Lahore



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11.	Engr.Syed Zeeshan Arif	Data Engineer/ Mud logger Petro Service Hyderabad
12.	Shahbaz Muhammad	Assistant geophysicist GSP, Lahore
13.	Muhammad Usman Alvi	Scientific Officer, PCSIR LABS, Lahore
14.	Engr.Taimoor Iftikhar	Site Supervisor, Hadi Construction Co Nowshera KPK
15.	Muhammad Shahzad	Director, NAVTTC, Islamabad



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**Members of the Curriculum Validation Committee**

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1.	Saima Asghar	DACUM Facilitator, Lahore
2.	Engr. M. Muneeb Ur Rehman Khan	Measurement Engineer, ACC pvt Ltd
3.	Dr. Muhammad Naeem Khan	AP, Govt Science College Wahdat Road, Lahore
4.	Dr. Farhat Yasmeen	Professor, UET Lahore
5.	Dr. Irfan Hafeez	Senior Scientific Officer, PCSIR Lahore
6.	Dr. Shahid Tufail Sheikh	Member Science(Retired), Ex-Head of MPRC Lahore
7.	Dr. Asma Sheikh	Scientific Officer, PCSIR Lahore
8.	Mohammad Shahbaz	Assistant Director, Mining Development Cell, Lahore
9.	Syed Zafar Ayab Hussain Shah	Project Coordinator, ZKB Construction ,Peshawar
10.	Muhammad Irfan Zubair	Deputy Director GSP, Lahore



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12.	Muhammad Usman Alvi	Scientific Officer, PCSIR LABS, Lahore
13.	Engr.Taimoor Iftikhar	Site Supervisor, Hadi Construction Co Nowshera KPK
14.	Muhammad Shahzad	Director, NAVTTTC, Islamabad