

Curriculum

For

“Crush Plant Assistant”

(Level -2)



25th to 29th October 2021



**National Vocational & Technical
Training Commission**

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Introduction

Definition/ Description of the training programme for “Crush Plant Assistant”

There is an increasing demand of the crush plant assistant in construction industry. If an individual is planning to pursue a career in crush plant technology, this program will be helpful in targeting various industries including construction and mining.

Purpose of the training programme

The purpose of this training is to develop a range of skills and techniques, soft skills and attributes essential for successful performance in construction and mining sector in accordance with industry requirements. Diploma holder of this program may find employment in local and international industries.

Overall objectives of training programme

The main objective of this training program is to improve the employability of young diploma holder through qualifying job-related training in the construction and mining sector, and to train them so that they can prove to be an asset to this sector.

Competencies to be gained after completion of course

- Follow Safety Rules at Site
- Perform Basic Communication Skills
- Demonstrate Basic Numeracy Skills
- Perform Basic Technical Drawing
- Perform Basic Computer Operations
- Maintain Inventory at Site
- Perform Bench Work
- Perform Basic Routine Maintenance of Plant

Possible available job opportunities available immediately and later in the future

- Site Store Assistant
- Plant Mechanic Helper
- Assistant of Crush Plant Operator

Trainee entry level

Middle or Equivalent (with English, Urdu, Numeracy, reading and writing skills)

Minimum qualification of trainer

Teaching staff should have Matriculation with at least five years' experience in Crushing Industry. Other formal certification in the Crushing Plant installation and operation from the manufacture or general fitter would be useful in addition to the above.

OR

Teacher should have Level-4 / DAE in Mechanical / Mechanical with specialization in construction machinery with at least one years' experience in Crushing Industry. Other formal certification in the Crushing Plant installation and operation from the manufacture or general Fitter would be useful in addition to the above.

Recommended trainer: trainee ratio

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

Medium of instruction i.e. language of instruction

Instruction will be Urdu and English.

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

This curriculum comprises 8 modules. The recommended delivery time is 600 hours.

Delivery of the course could therefore be full time, 5 days a week. Training providers are at liberty to develop other models of delivery, including part-time and evening delivery.

The full structure of the course is as follow:

No	Modules Title	Level	Theory		Practical		Total	
			C	Hr.	C	Hr.	C	Hr.
1.	Follow Safety Rules at Site	2	0.9	9	2.1	21	3	30
2.	Perform Basic Communication Skills	2	0.9	9	2.1	21	3	30
3.	Demonstrate Basic Numeracy Skills	2	1.8	18	4.2	42	6	60
4.	Perform Basic Technical Drawing	2	2.3	23	5.7	57	8	80
5.	Perform Basic Computer Operations	2	2.1	21	3.9	39	6	60
6.	Maintain Inventory at Site	2	1.1	11	6.9	69	8	80
7.	Perform Bench Work	2	2.8	28	10.2	102	13	130
8.	Perform Basic Routine Maintenance of Plant	2	3.1	31	9.9	99	13	130
Total			15	150	45	450	60	600

Sequence of the Modules

Each module covers a range of learning components. These are intended to provide detailed guidance to teachers (for example the Learning Elements component) and give them additional support for preparing their lessons (for example the Materials Required component). The detail provided by each module will contribute to a standardized approach to teaching, ensuring that training providers in different parts of the country have clear information on what should be taught. Each module also incorporates the industrial needs of Pakistan.

The distribution table is shown below:

Module 1: Follow Safety Rules at Site Safety 30 Hours	Module 4: Perform Basic Technical Drawing 80 Hours	Module 6: Maintain Inventory at Site 80 Hours
Module 2: Perform Basic Communication Skills 30 Hours		Module 7: Perform Bench Work 130 Hours
Module 3: Demonstrate Basic Numeracy Skills 60 Hours	Module 5: Perform Basic Computer Operations 60Hours	Module 8: Perform Basic Routine Maintenance of Plant 130 Hours

Summary – overview of the curriculum

Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
Module 1: Follow Safety Rules at Site Aim: After successful completion of this module, the trainee is competent in Following of Safety Rules at Site	LU1: Maintain occupational safety and health at workplace LU2: USE Personal Protective and Safety Equipment (PPE) LU3: Perform Communication Signals LU4: Manual Handling of Loads	9	21	30
Module 2: Perform Basic Communication Skills Aim: After successful completion of this module, the trainee is competent in performing basic communication skills	LU1: Work in Team LU2: Follow Supervisor's instructions	9	21	30

Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
Module 3: Demonstrate Basic Numeracy Skills Aim: After successful completion of this module, the trainee is competent in demonstrating basic numeracy skills	LU1: Apply Basic Numeracy Skills LU2: Perform Measurement LU3: Calculate Area and Volume of Aggregate	18	42	60
Module 4: Perform basic technical drawing Aim: After successful completion of this module, the trainee is competent in performing basic technical drawing	LU1: Explore Lettering, Lines and symbols LU2: Draw Different Geometrical Shapes LU3: Explore Orthographic views of simple shapes LU4: Dimension the drawing	23	57	80

Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
Module 5: Perform basic computer operations Aim: After successful completion of this module, the trainee is competent in performing basic computer operations	LU1: Perform basic Configuration of Computer System LU2: Create a document using MS word LU3: Create an e-mail account	21	39	60
Module 6: Maintain Inventory at Site Aim: After successful completion of this module, the trainee is competent in Maintaining Inventory at Site	LU1: Explore capacities and basic attachments of Machine LU2: Maintain tool box LU3: Manage Inventory of tools and equipment	11	69	80

Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
Module 7: Perform Bench Works Aim: After successful completion of this module, the trainee is competent in Performing Bench Works	LU1: Carry out Sawing LU2: Carry out Filing LU3: Carry out hand Drilling LU4: Carry out Reaming LU5: Carry out Tapping LU6: Calibrate Vernier Caliper/ micro meter LU7: Perform General Housekeeping & Maintenance	28	102	130
Module 8: Perform Basic Routine Maintenance of Plant Aim: After successful completion of this module, the trainee is competent in Performing Basic Routine Maintenance of Plant	LU1 Perform routine checks of plant equipment LU2: Service lubrication system LU3: Service cooling system LU4: Service air intake system LU5: Service the battery	31	99	130

Module 1: Follow Safety Rules at site

Objective of the module: The aim of this module to get knowledge, skills and understanding to maintain personal health, hygiene and safety

Duration: 30 hours **Theory:** 9 hours **Practical:** 21 hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Maintain occupational safety and health at workplace	The trainee will be able to: <ol style="list-style-type: none"> 1. Identify the safety signs and symbols 2. Erect barricades, hoardings, signage in the hazardous areas 3. Maintain housekeeping 4. Report unsafe condition to immediate supervisor (shift person) 	<ul style="list-style-type: none"> • Knowledge of different types of hazards • Explain unsafe working conditions • Understanding of health and safety signs and symbols • Explain housekeeping • Understanding of different methods of dealing with hazard <p>Activity: Practice to identify the physical hazards in mock situation and apply control measures, safety sign and barricade.</p>	Total 6hrs Theory: 2 hrs Practical: 4 hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • White Board Marker Non Consumable <ul style="list-style-type: none"> • White board • Multimedia 	<ul style="list-style-type: none"> • Class Room • Simulated environment
LU2: Use Personal Protective and Safety	The trainee will be able to: <ol style="list-style-type: none"> 1. Identify risk associated with job 	<ul style="list-style-type: none"> • Describe the types of Personal protective equipment (PPEs) 	Total: 9 hrs Theory: 3hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers 	<ul style="list-style-type: none"> • Class Room • Simulated environment

Equipment (PPE)	<p>to be done</p> <ol style="list-style-type: none"> 2. Select PPE according to job 3. Wear PPE according to job 4. Store PPE at Designated place after use 	<ul style="list-style-type: none"> Describe the procedure to identify risk associated with job to be done Importance of personal protective equipment Describe the Maintenance and cleaning of PPEs Describe the procedure to wear full body harness <p>Activity:</p> <ul style="list-style-type: none"> Demonstrate to select PPEs for specific job. Practice to wear full body harness and anchorage 	<p>Practical:</p> <p>6hrs</p>	<ul style="list-style-type: none"> Sharpeners White Board Marker <p>Non Consumable</p> <ul style="list-style-type: none"> White board Multimedia PPEs (Safety glasses, Ear muffs/ear plugs, Protective Gloves, Cap, Safety shoes etc.) 	
LU3:Perfrom communication signals	<p>The trainee will be able to:</p> <ol style="list-style-type: none"> 1. Identify different types of communication hand signals. 2. Use appropriate hand signals as 	<ul style="list-style-type: none"> Understanding of different types of communication signals Explain different types of hand signals Explain the importance of hand signals <p>Activity:</p>	<p>Total</p> <p>6hrs</p> <p>Theory:</p> <p>2 hrs</p> <p>Practical:</p> <p>4 hrs</p>	<p>Consumable</p> <ul style="list-style-type: none"> Notebooks Pencils Erasers Sharpeners White Board Marker <p>Non</p>	<ul style="list-style-type: none"> Class Room Simulated environment

	per situation	Demonstrate the hand signals for different activities		Consumable <ul style="list-style-type: none"> • White board • Multimedia • Safety manuals 	
LU4: Manual handling of loads	The trainee will be able to: <ol style="list-style-type: none"> 1. Check the load's weight to be handles 2. Check the availability of broad stable base 3. Lift and place the load with proper posture 4. Lift the load as per given standards 	<ul style="list-style-type: none"> • Explain the importance of safely lifting loads • Describe types of loads • Explain basic ergonomics principles • State the load lifting procedures Activity: Practice of shifting manually the load from ground to a designated location.	Total: 9 hrs Theory: 2hrs Practical: 7hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • White Board Marker Non Consumable <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system 	<ul style="list-style-type: none"> • Class Room • Simulated environment

Module2: Perform Basic Communication Skills

Objective of the module: The aim of this module to get knowledge, skills and understanding to perform basic communication.

Duration: 30 hours **Theory:** 9 hours **Practical:** 21hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Demonstrate the basic communication skills	The trainee will be able to: <ol style="list-style-type: none"> 1. Demonstrate the listening skills 2. Demonstrate the reading skills 3. Demonstrate the writing skills 4. Demonstrate the speaking skills 	<ul style="list-style-type: none"> • Knowledge of communication skills (7Cs of effective communication) • Describe verbal and non-verbal communication • Explain reporting techniques Activity: <ul style="list-style-type: none"> • Practice to listen to the audio and write down • Practice to note down the instructions given by the supervisor 	Total: 15 hrs Theory: 5hrs Practical: 10hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • White board marker Non Consumable <ul style="list-style-type: none"> • White board 	<ul style="list-style-type: none"> • Class Room

LU2. Follow Supervisor's instructions	The trainee will be able to: 1. Carry out the instructions of the supervisor 2. Report to the supervisor as per organizational SOP's given standards	<ul style="list-style-type: none"> • Explain the note taking procedure • Understanding of the standard procedure to prepare the report Activity: <ul style="list-style-type: none"> • Prepare different office reports 	Total: 15 hrs Theory: 4hrs Practical: 11hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • White board marker Non Consumable <ul style="list-style-type: none"> • White board 	<ul style="list-style-type: none"> • Class Room
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Module3: Demonstrate Basic Numeracy Skills

Objective of the module: The aim of this module to get knowledge, skills and understanding to demonstrate basic numeracy skills

Duration: 60hours

Theory: 18hours

Practical: 42hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1:Apply Basic Numeracy Skills	The trainee will be able to: <ol style="list-style-type: none"> 1. Perform addition 2. Perform subtraction 3. Perform multiplication 4. Perform division 5. Calculate percentage 	<ul style="list-style-type: none"> • Understanding of basic principles of addition, subtraction, multiplication division of whole number and fraction • Explain how to calculate percentage 	Total: 10hrs. Theory: 2 hrs. Practical: 8hrs.	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • Pen • White board marker 	<ul style="list-style-type: none"> • Class Room
		Activity: <ul style="list-style-type: none"> • Practice of addition, subtraction, multiplication division of whole number and fraction • Practice to calculate percentage between referred number 		Non Consumable <ul style="list-style-type: none"> • White board 	
LU2:Perform Measurement	The trainee will be able to: <ol style="list-style-type: none"> 1. Select measuring tools as 	<ul style="list-style-type: none"> • Understanding of basic 	Total: 20hrs	Consumable <ul style="list-style-type: none"> • Notebooks 	<ul style="list-style-type: none"> • Class Room

	<p>per requirement</p> <p>2. Identify imperial and metric system</p> <p>3. Perform inter conversion of measuring units</p>	<p>measuring units.</p> <ul style="list-style-type: none"> • Knowledge of measuring tools • Understanding of Imperial and metric system of measurements. • Explain the inter-conversion between measuring units. 	<p>Theory:4hrs</p> <p>Practical:16hrs</p>	<ul style="list-style-type: none"> • Pencils • Erasers • Sharpeners • White board marker <p>Non</p> <p>Consumable</p> <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • Printer • Measuring tape • Scale 	
		<p>Activity:</p> <ol style="list-style-type: none"> 1. Take the measurement of different geometrical figures with scale. 2. Practice to measure the boundaries of specific land and calculate its area and perimeter. 3. Take the measurements of different solids 4. Practice of inter-conversion of units. 			

LU3: Calculate Area and Volume of Aggregate	The trainee will be able to: <ol style="list-style-type: none"> 1. Calculate area of geometrical figures 2. Calculate volume of solid figures 3. Calculate quantities of materials in the stack/pile of stone aggregate by incorporating time saving practices 	<ul style="list-style-type: none"> • Knowledge of geometrical figures and solids. • Understanding the surface area and volume of solid figures. • Explain the method of calculating quantity of material in piles/stack. Activity: <ul style="list-style-type: none"> • Practice to calculate the surface area and volume of given geometrical figures and solids. • Practice to calculate quantity of material in piles/stack. 	Total:30hrs Theory: 4hrs. Practical:26hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • White board marker Non Consumable <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • Printer • Measuring tape • Scale • 3D model of geometrical solids 	Class Room/workshop
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Module4: Perform Basic Technical Drawing

Objective of the module: The aim of this module to get knowledge, skills and understanding to perform basic technical drawing

Duration: 80

Theory: 23hours

Practical: 57hours

hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Explore Lettering, Lines and symbols	The trainee will be able to: <ol style="list-style-type: none"> 1. Draw different types of lettering 2. Draw different types of lines 3. Draw different drawing symbols 	<ul style="list-style-type: none"> • Knowledge of different types of lines • Knowledge of different lettering style. • Understanding of symbols used in technical drawings. • Knowledge of different scales. • Understanding of different drawing pencils (Clutch pencil Mechanical pencils, etc.) • Understanding of different grades of lead pencils(H,HB,B) • Knowledge of different drawing sheets (scholar sheet, chart paper, Canson Sheet, etc.) 	Total: 20hrs Theory: 5hrs Practical: 15hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Erasers • Sharpeners • White board marker • Drawing sheets • Drawing pen • Masking tape • Different drawing pencils 	<ul style="list-style-type: none"> • Class Room/Drawing hall

		Activity: <ul style="list-style-type: none"> Practice to draw of title block Practice to draw of different lines Practice to draw of different types of lettering Practice of drawing symbols 		<ul style="list-style-type: none"> Scale <div>Non</div> <div>Consumable</div> <ul style="list-style-type: none"> White board Multimedia Internet Computer system Drawing board Drawing instruments 	
LU2. Explore Orthographic views of simple shapes	The trainee will be able to: <ol style="list-style-type: none"> 1. Draw first angle projection 2. Draw third angle projection 3. Draw missing views 4. Draw different section views 	<ul style="list-style-type: none"> Knowledge of orthographic projection Explain the rules of 1st and 3rd angle projection Explain pictorial drawings Understanding of sectional views 	Total: 45hrs Theory: 13hrs Practical: 32hrs	<div>Consumable</div> <ul style="list-style-type: none"> Notebooks Erasers Sharpeners White board marker Drawing 	<ul style="list-style-type: none"> Class Room/Drawing hall

		Activity: <ul style="list-style-type: none"> Practice to draw first angle projection of simple object blocks. Practice to draw third angle projection of simple object blocks. Practice to draw the missing view of different given orthographic projection. Practice to draw the section view of different blocks. 		sheets <ul style="list-style-type: none"> Drawing pen Masking tape Different drawing pencils Scale Non Consumable <ul style="list-style-type: none"> White board Multimedia Internet Computer system Drawing board Drawing instruments 	
LU3. Dimension the drawing	1. Draw different types of dimensions. 2. Draw geometrical tolerance.	<ul style="list-style-type: none"> Describe the different dimensioning principles Explanation of geometrical tolerance 	Total: 15 hrs Theory: 5 hrs Practical: 10hrs	Consumable <ul style="list-style-type: none"> Notebooks Erasers Sharpeners White board 	Class Room/Drawing hall

		<p>Activity:</p> <ul style="list-style-type: none"> Practice to dimension the given orthographic projections with different dimensioning style. 		<p>marker</p> <ul style="list-style-type: none"> Drawing sheets Drawing pen Masking tape Different drawing pencils Scale <p>Non-Consumable</p> <ul style="list-style-type: none"> White board Multimedia Internet Computer system Drawing board Drawing instruments 	
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Module 5: Perform Basic Computer Operations

Objective of the module: The aim of this module to get knowledge, skills and understanding of Basic Computer Operations

Duration: 60

Theory: 21hours

Practical: 39 hours

hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Perform basic Configuration of Computer System	The trainee will be able to: <ol style="list-style-type: none"> 1. Connect computer components and peripherals as per requirement 2. Install drivers and applications according to the software specification 3. Troubleshoot applications to trace and fix faults in a specific application to bring it in a running condition 	<ul style="list-style-type: none"> • Knowledge of different computer components. . • Explain operating systems • Differentiate Hardware and Software • Describe the process of troubleshooting of application software. Activity: <ul style="list-style-type: none"> • Practice of installing operating system. • Practice of installing Microsoft Office. • Practice of printer and scanner installation. 	Total: 28hrs Theory: 9 hrs Practical: 19hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • White board marker Non Consumable <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • Pen • Operating system CD 	<ul style="list-style-type: none"> • Computer Lab

				<ul style="list-style-type: none"> Software and peripheral driver CD 	
LU2: Create a document using MS word	The trainee will be able to: <ol style="list-style-type: none"> 1. Compose a document as per the requirement 2. Format Word Document according to given requirements 3. Print Word Documents according to requirements 	<ul style="list-style-type: none"> Describe the page set up and paragraph for formatting. Describe the font size and style. Knowledge of short keys Explain printing and type of printers. 	Total: 17hrs Theory: 7 hrs Practical: 10hrs	<div>Consumable</div> <ul style="list-style-type: none"> Notebooks Pencils Erasers Sharpeners White board marker <div>Non</div> <div>Consumable</div> <ul style="list-style-type: none"> White board Multimedia Internet Computer system Software CD 	<ul style="list-style-type: none"> Computer Labs

LU3: Create an e-mail account	The trainee will be able to: <ol style="list-style-type: none"> 1. Select email browser 2. Go to sign in page 3. Add Personal Information 4. Enter and confirm password 	<ul style="list-style-type: none"> • Describe Internet and E-mail address. • Knowledge of email attachments • Explain encryption of email address and documents. Activity: <ul style="list-style-type: none"> • Practice of creating an email address and sending an email along with an attachment (document and picture) 	Total: 15 hrs Theory: 5 hr Practical: 10 hrs	<div>Consumable</div> <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • White board marker <div>Non Consumable</div> <ul style="list-style-type: none"> • White board • Multimedia • Internet browser • Internet • Computer system 	<ul style="list-style-type: none"> • Computer Lab
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Module6: Maintain Inventory at Site

Objective of the module: The aim of this module to get knowledge, skills and understanding to maintain inventory at site

Duration: 80hours

Theory: 11

Practical: 69hours

hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Explore capacities and basic attachments of Machine	<p>The trainee will be able to:</p> <ol style="list-style-type: none"> 1. Identify capacity of plant/machinery as per manufacturers specifications 2. Identify standard tools supplied with machines 3. Identify spares/consumable materials 	<ul style="list-style-type: none"> • Knowledge of different types of crushers and their attachments. • Explain the capacities of crushing plant. • Describe different types of hauling machinery of crushing plants <p>Activity:</p> <ul style="list-style-type: none"> • Practice of Identifying different attachments and components of crush plant. • Practice of finding out the capacity of crush plant and capabilities of its attachments. 	<p>Total:34 hrs</p> <p>Theory:5 hrs</p> <p>Practical:29 hrs</p>	<p>Consumable</p> <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • White board marker <p>Non Consumable</p> <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • Crushing Plant 	<ul style="list-style-type: none"> • Class Room/ On site

LU2: Maintain tool box	The trainee will be able to: <ol style="list-style-type: none"> 1. Check physical condition of tools 2. Place tools in tool box as per layout 3. Perform preventive maintenance of tools as per standards 4. Perform corrective maintenance of tools as per standards 5. Clean tools after use 	<ul style="list-style-type: none"> • Knowledge of components of a tools box. • Explain the types of tools maintenance. • Explain the preventive and corrective maintenance of measuring tools. Activity: <ul style="list-style-type: none"> • Practice to inspect the tools and perform its preventive and corrective maintenance • Practice to clean and lubricate the tools. 	Total: 23hrs Theory: 3hrs Practical: 20 hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • Whiteboard marker Non Consumable <ul style="list-style-type: none"> • White board • Multimedia • Tool box 	<ul style="list-style-type: none"> • Class Room/ On site/ Workshop
LU3: Manage Inventory of tools and equipment	The trainee will be able to: <ol style="list-style-type: none"> 1. Identify number of tools and equipment as per record 2. Report for faulty tools and equipment 3. Generate demand for defective tools and equipment 4. Prepare record of all tools and equipment 	<ul style="list-style-type: none"> • Explain the Inventory system of tools and equipment • Explain the checklists to inspect and generation of report for faulty tools. • Knowledge of entry procedure in inventory register. 	Total: 23hrs Theory: 3hrs Practical: 20hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • Whiteboard marker 	<ul style="list-style-type: none"> • Class Room/on site/ workshop

		Activity: <ul style="list-style-type: none"> • Practice to identify the faulty tools and generate report • Practice to prepare the inventory register for the tool equipment at site store. • Practice to generate demand tool and equipment as per job order. 		<div>Non</div> <div>Consumable</div> <ul style="list-style-type: none"> • White board • Multimedia • Tool box 	
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Module7: Perform Bench Works

Objective of the module: The aim of this module to get knowledge, skills and understanding to perform bench works.

Duration: 130hours

Theory: 28 hours

Practical: 102hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Carry out Sawing	The trainee will be able to: <ol style="list-style-type: none"> 1. Select blade according to the material and set in hacksaw frame 2. Mark layout of job as per drawing using required marking tool 3. Perform clamping of the work piece according to the instructions 4. Perform sawing according to the given 	<ul style="list-style-type: none"> • Explain basic mechanical drawings and drawing symbols • Explain different types & application of clamping devices • Explain different types of nut and bolts • Explain different types of torque wrench • Explain different types and uses of basic measuring instruments required during different operations • Explain different types and uses of layout tools • Knowledge of different types of hacksaw blades and its use 	Total: 23hrs. Theory: 6hrs Practical: 17hrs	<div>Consumable</div> <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • Sawing Blades • Whiteboard marker <div>Non Consumable</div> <ul style="list-style-type: none"> • White board 	<ul style="list-style-type: none"> • Class Room/workshop

	<p>instructions</p> <ol style="list-style-type: none"> 5. Inspect quality of the job at suitable intervals. 6. Verify the final job with the given drawing 	<p>Activity:</p> <ul style="list-style-type: none"> • Practice of sawing the mild steel work piece with hand hacksaw. 		<ul style="list-style-type: none"> • Scriber • Measuring Tape • Scale • Torque wrench 	
<p>LU2:Carry out Filing</p>	<p>The trainee will be able to:</p> <ol style="list-style-type: none"> 1. Select required file type according to the material 2. Select required marking tool and mark layout of job as per drawing 3. Select clamping device and clamp the work piece 4. Perform filing as per standard procedures 5. Inspect quality of the job at suitable intervals. 6. Verify the final job with the given drawing 	<ul style="list-style-type: none"> • Explain different file types and its usage. Knowledge of different tools required during grinding operations • Explain the standard filing procedure. <p>Activity:</p> <ul style="list-style-type: none"> • Practice of filing the surface and edges on mild steel work piece according to given drawing. 	<p>Total: 12hrs</p> <p>Theory:2hrs</p> <p>Practical:10hrs</p>	<p>Consumable</p> <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • Whiteboard maker <p>Non Consumable</p> <ul style="list-style-type: none"> • White board • Multimedia • Files • Measuring tape • Scriber • Scale 	<ul style="list-style-type: none"> • Class Room/workshop

LU3: Carry out hand Drilling	<p>The trainee will be able to:</p> <ol style="list-style-type: none"> 1. Select hand brace and drilling bit according to the job requirement. 2. Use marking tool and measuring instruments as per job requirement. 3. Clamp the work piece as per job requirement. 4. Perform drilling as per standard procedures 5. Inspect quality of job at suitable intervals. 6. Perform post drilling operations 7. Verify the final job with the given drawing 	<ul style="list-style-type: none"> • Explain different types & properties of material • Knowledge of drilling process and its usage. • Explain different types of drill bits. <p>Activity:</p> <ul style="list-style-type: none"> • Practice to drill hole of different diameter with hand brace in the work piece as per drawing. 	<p>Total:24hrs</p> <p>Theory:4hrs</p> <p>Practical:20hrs</p>	<p>Consumable</p> <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • Drill bits • Whiteboard marker <p>Non Consumable</p> <ul style="list-style-type: none"> • White board • Multimedia • Scraper • Hand brace • Round files • Hand drill • Center punch • Hammer 	<ul style="list-style-type: none"> • Class Room/workshop
LU4: Carry out Reaming	<p>The trainee will be able to:</p> <ol style="list-style-type: none"> 1. Select required reamer according to the job specification 2. Select required 	<ul style="list-style-type: none"> • Explain the importance of reaming. • Explain different types and application of reamers. 	<p>Total:19 hrs</p> <p>Theory:4hrs</p> <p>Practical:15hrs</p>	<p>Consumable</p> <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers 	<ul style="list-style-type: none"> • Class Room/workshop

	marking tool and mark layout of job as per drawing 3. Select clamping device and clamp the work piece 4. Perform drilling to produce hole 5. Perform reaming as per job specification 6. Verify final job with given drawing	Activity: <ul style="list-style-type: none"> Practice of reaming on drilled holes of different diameter of work piece. 		<ul style="list-style-type: none"> Sharpeners Drill bit Whiteboard marker Non Consumable <ul style="list-style-type: none"> White board Multimedia Reamer Hand brace Hand drill 	
LU5: Carry out Tapping	The trainee will be able to: <ol style="list-style-type: none"> Select required tap according to the job 	<ul style="list-style-type: none"> Explain the types of tapping. Understanding of pitch gauge. Describe different methods of tapping. Explain tap and die set. 	Total: 24hrs Theory: 4hrs	Consumable <ul style="list-style-type: none"> Notebooks Pencils 	<ul style="list-style-type: none"> Class Room/workshop

	<p>specification</p> <ol style="list-style-type: none"> 2. Select required marking tool and mark layout of job as per drawing 3. Select clamping device and clamp the work piece 4. Perform drilling to produce hole according to tap size 5. Perform tapping as per job specification 6. Verify final job with given drawing 	<p>Activity:</p> <ul style="list-style-type: none"> • Select the tap according to the drilled holes of different sizes on the work piece. • Practice of tapping on drilled holes on work piece to make an internal thread. 	<p>Practical:20hrs</p>	<ul style="list-style-type: none"> • Erasers • Sharpeners • Whiteboard marker <p>Non Consumable</p> <ul style="list-style-type: none"> • White board • Multimedia • Tapping set • Center punch • Hammer 	
<p>LU6: Calibrate Vernier Caliper/ micro meter</p>	<p>The trainee will be able to:</p> <ol style="list-style-type: none"> 1. Close both jaws of Vernier Caliper/ micro meter. 2. Check zero error 3. Open up jaws and precisely match the both jaws and assemble device 	<ul style="list-style-type: none"> • Explain the importance of calibration of measuring tools. • Knowledge of precision tools. • Describe the procedure of calibration of Vernier Caliper and micro meter. <p>Activity:</p> <ul style="list-style-type: none"> • Practice to calibrate Vernier Caliper and micro meter. 	<p>Total: 14hrs</p> <p>Theory:4hrs</p> <p>Practical:10hrs</p>	<p>Consumable</p> <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • Whiteboard marker <p>Non Consumable</p> <ul style="list-style-type: none"> • White board • Multimedia • Precision tools (micrometer/ Vernier caliper) 	<ul style="list-style-type: none"> • Class Room/workshop

LU7: Perform General Housekeeping & Maintenance	The trainee will be able to: <ol style="list-style-type: none"> 1. Clean and maintain all workplace tools & machines as per housekeeping checklists or given instructions 2. Prepare checklist for daily cleanliness of the workplace 3. Place all tools & material in proper place to ensure safe work 4. Fill checklists to conduct maintenance and housekeeping of machines & tools 	<ul style="list-style-type: none"> • Explain guidelines and checklists to conduct maintenance and housekeeping of tools & equipment. • Explain the Importance of daily cleanliness of workplace. • Explain the Importance of storing tools and material in specific place. • Knowledge of faulty/damaged/ worn out parts of tools & equipment. • Explain the Importance of Record keeping. Activity: <ul style="list-style-type: none"> • Practice of sorting different types of tool, trace defects and perform maintenance. 	Total: 14hrs Theory:4hrs Practical:10hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • Whiteboard marker Non Consumable <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • Tool box • Layout tools • Cutting tools • Measuring tools • Precision tools 	<ul style="list-style-type: none"> • Class Room/workshop
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Module 8: Perform Basic Routine Maintenance of Plant

Objective of the module: The aim of this module to get knowledge, skills and understanding to perform basic routine maintenance of plant.

Duration: 130 hours **Theory:** 31 hours **Practical:** 99 hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Perform routine checks of plant equipment	<p>The trainee will be able to:</p> <ol style="list-style-type: none"> 1. Inspect oil, water and filter of compressor and generator 2. Check the oil level in all gear boxes and hydraulic unit as per the procedures set by the manufacturer 3. Check and adjust belts and ropes alignment as per machine manual 4. Inspect and clean crusher jaws 5. Lubricate moving parts of crusher plant 	<ul style="list-style-type: none"> • Describe types of conveyor belts, ropes, gate valve, switches, control valve, actuator, sensor, and gauges. • Explain the types of bearings, rollers, seals and gasket. • Describe the importance of alignment of moving parts and its adjustment. • State the procedure for topping up fuel, lubricant and coolants. • Explain types and nature of maintenance (preventative, periodic, corrective) uses, benefits and limitations. • Knowledge of tools, material and components required for routine maintenance. 	<p>Total:70hrs</p> <p>Theory:11hrs</p> <p>Practical:59hrs</p>	<p>Consumable</p> <ul style="list-style-type: none"> • Notebooks • Pen • Lubricant • Coolant • Hydraulic Oil • Filters • Sensors • Seals • Gasket • Conveyor Belts • Ropes • Bearings • Rollers • Whiteboard marker 	Class Room/workshop

	<p>6. Check and tightened all bolts and bearing sets</p> <p>7. Check and report damaged wiring ,loose electrical fitting switches and sensor</p> <p>8. Identify and resets all emergency stop switches</p> <p>9. Check and tighten all hydraulic and pneumatic connection and condition of flexible tube and rubber seals</p> <p>10. Inspect and report damage conveyer belt</p>	<ul style="list-style-type: none"> Practice of resetting emergency stop switches. <p>Activity:</p> <ul style="list-style-type: none"> Practice of checking the oil level in all gear boxes and hydraulic units. Practice of adjusting the belts and ropes. Practice of checking and tightening of hydraulic and pneumatic connections. Practice of resetting emergency stop switches. 		<p>Non Consumable</p> <ul style="list-style-type: none"> White board Multimedia Crush Plant site 	
LU2: Service lubrication system	<p>The trainee will be able to:</p> <ol style="list-style-type: none"> Identify low oil levels Top up oil levels Identify and report leakages 	<ul style="list-style-type: none"> Knowledge of Lubrication System. Explain Lubricant and its grade. Describe components of lubrication system. 	<p>Total:15hrs</p> <p>Theory:5hrs</p> <p>Practical:10hrs</p>	<p>Consumable</p> <ul style="list-style-type: none"> Notebooks Pen Lubricant Oil seal Whiteboard 	Class Room/workshop

		Activity: <ul style="list-style-type: none"> Practice of topping up of lubricant. Practice of visual inspection of leakage in the lubrication system and report. 		marker Non Consumable <ul style="list-style-type: none"> White board Multimedia Crush Plant on site 	
LU3: Service cooling system	The trainee will be able to: <ol style="list-style-type: none"> Adjust coolant level Replace belts and hoses 	<ul style="list-style-type: none"> Explain cooling System. Explain coolant and its agents. Describe components of cooling system. Define types of belts and hose pipes in cooling system. Explain corrosion resistor and it's working. 	Total: 15hrs Theory: 05hrs Practical: 10hrs	Consumable <ul style="list-style-type: none"> Notebooks Pen Coolant Hose Pipes Clamps Belts Corrosion Resistor Whiteboard marker 	Class Room/workshop

		Activity: <ul style="list-style-type: none"> • Practice of changing coolant. • Inspect the belts and hose pipe for any cracks and worn out. • Practice of replacing belts and hose pipe. • Inspect the corrosion resistor. 		Non Consumable <ul style="list-style-type: none"> • White board • Multimedia • Crush Plant on site 	
LU4: Service air intake system	The trainee will be able to: <ol style="list-style-type: none"> 1. Check air service indicators 2. Clean primary air filter 3. Replace intake hoses and clamps 	<ul style="list-style-type: none"> • Knowledge of air intake System. • Explain air filter and its types. • Define components of air intake system. • Describe air intake system sensors. 	Total: 15hrs Theory: 05hrs Practical: 10hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pen • Air filter • Air Hoses • Whiteboard marker Non Consumable <ul style="list-style-type: none"> • White board 	Class Room/workshop

		Activity: <ul style="list-style-type: none"> • Practice of inspecting the air filter. • Practice of cleaning the air filter. • Practice of tracing leakages in air intake system • • Practice to replace worn out hoses and damaged clamps 		<ul style="list-style-type: none"> • Multimedia • Crush Plant on site 	
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LU5: Service the battery	The trainee will be able to: <ol style="list-style-type: none"> 1. Check battery terminals 2. Check water level of batteries 3. Replace batteries 	<ul style="list-style-type: none"> • Explain battery System. • Define the components of battery. • Describe the electrolyte used in battery and procedure to check the specific gravity. • Knowledge of hydrometer. Activity: <ul style="list-style-type: none"> • Identify the terminal of battery (Positive and Negative) and cleaning the terminal sulphate and tightening. • Practice to check the electrolyte level and topping it. • Practice to check the specific gravity of battery and replace battery. 	Total:15hrs Theory:05hrs Practical:10hrs	<div>Consumable</div> <ul style="list-style-type: none"> • Notebooks • Pen • Battery • Electrolyte • Terminal clamps • Whiteboard marker <div>Non Consumable</div> <ul style="list-style-type: none"> • White board • Multimedia • Hydrometer 	Class Room/workshop
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General assessment guidance for *Crush Plant Assistance*

Good practice in Pakistan makes use of sessional and final assessments, the basis of which is described below. Good practice by vocational training providers in Pakistan is to use a combination of these sessional and final assessments, combined to produce the final qualification result.

Sessional assessment is going on all the time. Its purpose is to provide feedback on what students are learning:

- To the student: to identify achievement and areas for further work
- To the teacher: to evaluate the effectiveness of teaching to date, and to focus future plans.

Assessors need to devise sessional assessments for both theoretical and practical work. Guidance is provided in the assessment strategy

Final assessment is the assessment, usually on completion of a course or module, which says whether or not the student has "passed". It is – or should be – undertaken with reference to all the objectives or outcomes of the course, and is usually fairly formal. Considerations of security – ensuring that the student who gets the credit is the person who did the work – assume considerable importance in final assessment.

Methods of assessment

For lessons with a high quantity of theory, written or oral tests related to learning outcomes and/ or learning content can be conducted. For workplace lessons, assessment can focus on the quality of planning the related process, the quality of executing the process, the quality of the product and/or evaluation of the process.

Methods include direct assessment, which is the most desirable form of assessment. For this method, evidence is obtained by direct observation of the student's performance.

Examples for direct assessment of Crush Plant Assistant include:

- Work performances, for example perform basic communication, follow safety at site and perform basic computer operations
- Direct questioning, where the assessor would ask the student how to perform personal safety at work place, how they can communicate work place policy and procedures, how they can perform filling or reaming and how to calibrate Vernier Caliper/ micro meter
- Paper-based tests, such as multiple choice or short answer questions on basic numeracy or communication at work place policy and procedures.
- Indirect assessment is the method used where the performance could not be watched and evidence is gained indirectly.

Examples for indirect assessment of a Crush Plant Assistance include:

- Work products, such as installing/uninstalling different software in computer and also preparing report in MS word.

Indirect assessment should only be a second choice. (In some cases, it may not even be guaranteed that the work products were produced by the person being assessed.)

Principles of assessment

All assessments should be valid, reliable, fair and flexible:

Fairness means that there should be no advantages or disadvantages for any assessed person. For example, it should not happen that one student gets prior information about the type of work performance that will be assessed, while another candidate does not get any prior information.

Validity means that a valid assessment assesses what it claims to assess. For example, if carry out hand drilling and reaming are to be assessed and certificated, the assessment should involve performance criteria that are directly related to that activity. An interview about the hand drilling and reaming would not meet the performance criteria.

Reliability means that the assessment is consistent and reproducible. For example, if the work performance of preparing documents in words has been assessed, another assessor (e.g. the future employer) should be able to see the same work performance and witness the same level of achievement.

Flexibility means that the assessor has to be flexible concerning the assessment approach. For example, if there is a power failure during the assessment, the assessor should modify the arrangements to accommodate the students' needs.

Assessment strategy for Crush Plant Assistance

This curriculum consists of 8 modules:

- **Module 1:** Follow Safety Rules at Site
- **Module 2:** Perform Basic Communication Skills
- **Module 3:** Demonstrate Basic Numeracy Skills
- **Module 4:** Perform Basic Technical Drawing
- **Module 5:** Perform Basic Computer Operations
- **Module 6:** Maintain Inventory at Site
- **Module 7:** Perform Bench Work
- **Module 8:** Perform Basic Routine Maintenance of Plant

Sessional assessment

The sessional assessment for all modules shall be in two parts: theoretical assessment and practical assessment. The sessional marks shall contribute to the final qualification.

Theoretical assessment for all learning modules must consist of a written paper lasting at least one hour per module. This can be a combination of multiple choice and short answer questions.

For practical assessment, all procedures and methods for the modules must be assessed on a sessional basis. Guidance is provided below under Planning for assessment.

Final assessment

Final assessment shall be in two parts: theoretical assessment and practical assessment. The final assessment marks shall contribute to the final qualification.

The assessment team

The number of assessors must meet the needs of the students and the training provider. For example, where two assessors are conducting the assessment, there must be a maximum of five students per assessor. In this example, a group of 25 students shall therefore require assessments to be carried out over a four-day period. For a group of only 10 to 15 students, assessments would be carried out over a two-day period only.

Planning for assessment

Sessional assessment: assessors need to plan in advance how they will conduct sessional assessments for each module. The tables on the following pages are for assessors to use to insert how many hours of theoretical and practical assessment will be conducted and what the scheduled dates is Final assessment: Training providers need to decide ways to combine modules into a cohesive two-day final assessment programme for each group of five students. Training providers must agree the content for practical assessments in advance.

Complete list of tools and equipment

Sr#	Description	Quantity
1.	Computer Systems	26
2.	Scanner	1
3.	Printer	1
4.	Drilling tools (hand brace, twist drill, center drill, counter boring tool , reamer, taps etc)	1
5.	Steel Rules	25
6.	Tri Square	25
7.	Vernier Caliper	25
8.	Micro meter	25
9.	Thread gauges	10
10.	Screw pitch gauges	10
11.	Feeler gauges	10
12.	Set of Adjustable Wrench	5
13.	Set of Spanners (Open end, Ring)	5
14.	Pipe wrench	5
15.	L-key sets	5
16.	Nose pliers	5
17.	Grip pliers	5
18.	Straight peen Hammer	5
19.	Ball peen Hammer	5
20.	Cross peen Hammer	5

21.	Sledge Hammer	5
22.	Long nose Tong	5
23.	Short nose tong	10
24.	Flat Chisel	5
25.	Scraper of different shapes	2
26.	Scriber	5
27.	Diamond hand file set	5
28.	Needle hand file set	5
29.	Round hand file	2
30.	Half round hand file	5
31.	Triangular hand file	5
32.	Square hand file	5
33.	Flat hand file	5
34.	Drawing board	5
35.	Jaw crusher	5
36.	Gyratory crushers	5
37.	Cone crusher	5
38.	Torque wrench	5
39.	Pipe Wrench	10
40.	Lubricating can	25
41.	Greasing gun	10
42.	Measuring tape(Steel)	10
43.	Inside caliper	10

44.	Outside caliper	5
45.	Common screw driver set	5
46.	Philips screw driver set	5
47.	Hacksaw frame with blades	5

List of Consumable Supplies

Sr no	Material	Quantity
1.	Note book	25
2.	Pencil	25
3.	White sheets	25
4.	Eraser	25
5.	Sharpener	25
6.	Pen	25
7.	Clutch pencils	25
8.	Sticky Notes	25
9.	Card sheets	100
10.	Cleaning brush	25
11.	Cotton rags	1KG
12.	PPE's	25
13.	Lubricants	In Litters
14.	Drawing Board	25
15.	Drawing Sheets	25 Books
16.	Inventory sheet	12

17.	Round Bar	50 kg
18.	Metallic strips	20 kg
19.	Electrode	5 Pack

Credit values

The credit value of the National Certificate Level 2 in Crush Plant Assistant is defined by estimating the amount of time/ instruction hours required to complete each competency unit and competency standard. The NVQF uses a standard credit value of 1 credit = 10 hours of learning (Following Higher Education Commission (HEC) guidelines).

The credit values are as follows:

Modules	Estimate of hours	Credit
A. Follow Safety Rules at Site	30	03
B. Perform Basic Communication Skills	30	03
C. Demonstrate Basic Numeracy Skills	60	06
D. Perform Basic Technical Drawing	80	08
E. Perform Basic Computer Operations	60	06
F. Maintain Inventory at Site	80	08
G. Perform Bench Work	130	13
H. Perform Basic Routine Maintenance of Plant	130	13