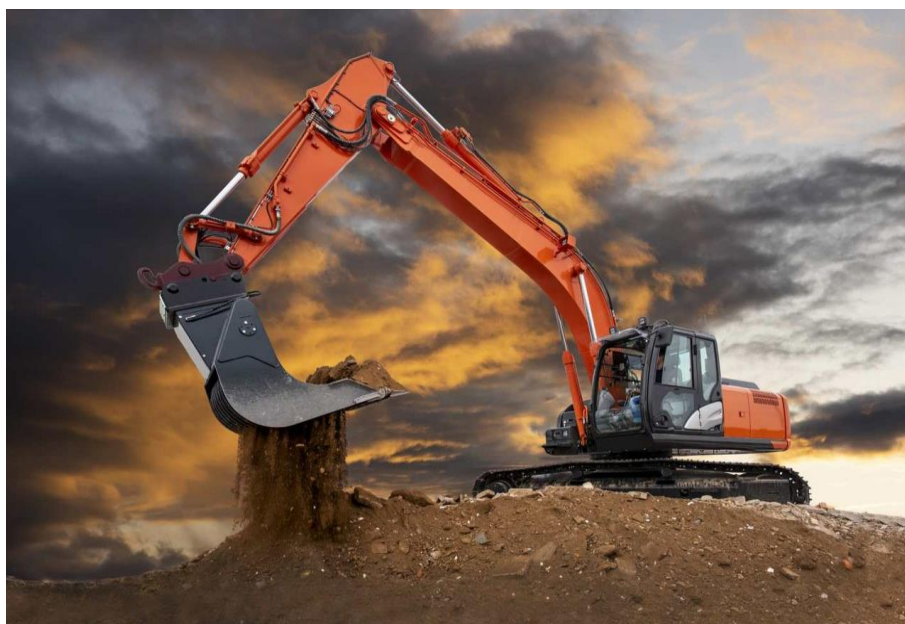


Curriculum For “Digging Operation/Technology” (Operational Supervisor) (Level -5)



25th to 29th October 2021



**National Vocational & Technical
Training Commission**

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- Communicate at workplace
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- Perform 2D & 3D Engineering Drawings using CAD
- Perform Welding Operations

General assessment guidance for *Dies & Mould Technology*

Complete list of tools and equipment

List of consumable supplies

Credit values

Introduction

Definition/ Description of the training programme for *Digging Operation/Technology*

There is an increasing demand of the Digging Operation Supervisor in civil construction or mining industry. If an individual is planning to pursue a career in Digging or Excavation, this program will be helpful in targeting various industries including civil construction or mining, etc.

Purpose of the Training Programme

The purpose of this training is to develop a range of skills and techniques, personal skills and attributes essential for successful performance in civil construction or mining sector in accordance with industry requirements. Graduates 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 graduates through qualifying job-related training in the Digging/Excavation 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

- A- Develop Project Management Life Cycle
- B- Develop the Project Plan
- C- Supervise on -Site projects
- Plan the Project in Primavera P6
- Create Technical Documentation
- Develop entrepreneurial skills
- Practice Professionalism

Possible Available Job Opportunities Available Immediately and Later In The Future

- Instructor
- Assessor
- Civil Draftsman
- Architectural Draftsman
- Assistant Project Manager
- Operational Supervisor

Trainee Entry Level

For National Vocational Certificate Level-5 in “Technician” (Digging Operation Supervisor), the entry requirement is award of National Vocational Certificate Level-4 in “Digging Operation Supervisor” or equivalent Certificate in relevant field.

Minimum Qualification of Trainer

Teaching staff should have DAE with two years’ or 2 years Certificate with five years’ experience in Digging/Excavation. They should also hold or be working towards a formal teaching qualification.

Other formal qualifications in the Civil Construction or Mining 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 09 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:

Module	Theory ¹ Days/hours	Workplace ² Days/hours	Total hours
Module 1: Develop Project Management Life Cycle	40	60	100
Module 2: Develop the Project Plan	80	120	200
Module 3: Supervise on -Site projects	60	240	300
Module 4: Plan the Project in Primavera P6	60	90	150
Module 5: Create Technical Documentation	50	100	150
Module 6: Develop entrepreneurial skills	40	60	100
Module 7: Practice Professionalism	70	130	200

¹ Learning Module hours in training provider premises

² Training workshop, laboratory and on-the-job workplace

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 6: Develop entrepreneurial skills 100 Hours	Module 1: Develop Project Management Life Cycle 100 Hours	Module 7: Practice Professionalism 200 Hours
	Module 2: Develop the Project Plan 200 Hours	
	Module 3: Supervise on -Site projects 300 Hours	
	Module 4: Plan the Project in Primavera P6 150 Hours	
	Module 5: Create Technical Documentation 150 Hours	

Summary – Overview of the Curriculum

Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
Module 1: Develop Project Management Life Cycle Aim: After successful completion of this module, the trainee is competent in developing Project Management Life Cycle	LU1: Perform operations for initiation of project LU2: Support project planning and design processes LU3: Record and update project logs LU4: Coordinate with project planning team	20	80	100
Module 2: Develop the Project Plan Aim: After successful completion of this module, the trainee is competent in Developing the Project Plan	LU1: Specify the individual activities LU2: Determine the sequence of the Project activities LU3: Draw a flow diagram LU4: Estimate the completion time for each activity LU5: Prepare Project Time Management plan LU6: Expedite/crash progress of project LU7: Update the CPM diagram as the project progresses	40	160	200
Module 3: Supervise on-Site projects Aim: After successful completion of this module, the trainee is competent in Supervising on-Site projects	LU1: Determine quality requirements LU2: Implement Quality Assurance processes LU3: Perform Project Defect Analysis (PDA)	60	240	300

Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
Module 4: Plan the Project in Primavera P6 Aim: After successful completion of this module, the trainee is competent in Planning the Project in Primavera P6	LU1: Perform Basic operation in Primavera P6 LU2: Perform Project Activities Scheduling in Primavera P6 LU3: Perform Project Resources Costing &Planning in Primavera P6 LU4: Manage Project in Primavera P6	60	90	150
Module 5: Create Technical Documentation Aim: After successful completion of this module, the trainee is competent in Creating Technical Documentation	LU1: Identify and analyse documentation requirements and client needs LU2: Design documentation LU3: Develop documentation LU4: Evaluate and edit documentation LU5: Prepare documentation for publication	30	120	150
Module 6: Develop entrepreneurial skills Aim: After successful completion of this module, the trainee is competent in Developing entrepreneurial skills	LU1: Develop a business plan LU2: Collect information regarding funding sources LU3: Develop a marketing plan LU4: Develop basic business communication skills	20	80	100

Module Title and Aim	Learning Units	Theory Days/hours	Workplace Days/hours	Timeframe of modules
Module 7: Practice Professionalism Aim: After successful completion of this module, the trainee is competent in Practicing Professionalism	LU1: Develop Portfolio for industry LU2: Perform Internship	50	150	200

Modules

Module 1: Develop Project Management Life Cycle

Objective of the module: The aim of this module to get knowledge, skills and understanding to Identify and Implement Workplace policies and Procedures

Duration: 100 hours

Theory: 40 hours

Practical: 60 hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Perform operations for initiation of project	<p>The trainee will be able to:</p> <ol style="list-style-type: none"> 1. Prepare documents for project. 2. Establish relationship between the project and broader organisational strategies and goals 3. Document project objectives, outcomes and benefits 4. Establish the project governance structure-Induct requisite staff. 	<ul style="list-style-type: none"> • Define Project Management Life Cycle (project initiating, planning, execution and project closer, etc.) • Objectives and functions of project management • Organisational strategies and goals • Deming Cycle: Plan, Do, Check and Act (PDCA) • Project charter for approval-feasibility report. 	<p>Total: 25hrs Theory: 10hrs Practical: 15hrs</p>	<p>Consumable</p> <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners <p>Non Consumable</p> <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system 	Class room/Lab

	5. Drafting a project charter for approval- feasibility report.	Practical Activity: <ol style="list-style-type: none"> 1. Prepare PDCA Diagram of assigned project 2. Prepare a project charter for approval-feasibility report. 			
LU2: Support project planning and design processes	The trainee will be able to: <ol style="list-style-type: none"> 1. Support breakdown of project objectives into achievable project deliverables 2. Identify project stages, and key requirements for stage completion-resources, standards, and communication. 3. Identify project milestones and map clearly against time and objectives 4. Consolidate associated plans and baselines in project management plan 5. Get approval of project plan 	<ul style="list-style-type: none"> • Different stages and activities involved in construction projects: <ul style="list-style-type: none"> ○ Planning ○ Designing ○ Tendering ○ Execution ○ Monitoring ○ Completion • Types of civil engineering projects 	Total: 25hrs Theory: 10hrs Practical: 15hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners Non Consumable <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • Printer 	Class room/Lab

LU3: Record and update project logs	The trainee will be able to: <ol style="list-style-type: none"> 1. Maintain and update records against project deliverables and plans at required intervals 2. Prepare status reports on project progress and identified issues 3. Assist with undertaking an impact analysis of proposed changes to the project 4. Maintain relevant project logs and registers accurately and regularly to assist with project audit 5. Update associated plans to reflect project progress against baselines and approved changes 	<ul style="list-style-type: none"> • Document controlling and record keeping • Project progress Report • Scope of duties & responsibilities of construction team • Organisational chart of C&W department Irrigation & power department, public Health Engineering department <hr/> Practical Activity: <ol style="list-style-type: none"> 1. Prepare a status report of assigned project. 2. Prepare DPR (Daily Progress Report) of assigned project. 	Total: 25hrs Theory: 10hrs Practical: 15hrs	<div>Consumable</div> <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners <div>Non Consumable</div> <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • Printer 	Class room/Lab
LU4: Coordinate with project planning team	The trainee will be able to: <ol style="list-style-type: none"> 1. Assist project finalisation activities with concerned person 2. Prepare finalised project specifications 	<ul style="list-style-type: none"> • Coordination with 3Cs (Client, Consultant and Contractor) • Types of Organisations and their features: <ul style="list-style-type: none"> ○ Line staff ○ Direct 	Total: 25hrs Theory: 10hrs Practical: 15hrs	<div>Consumable</div> <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners <div>Non Consumable</div>	Class room/Lab

	<p>3. Prepare a report of project performance to assist with project review assessments</p>	<div> <ul style="list-style-type: none"> ○ Functional • Engineering departments of government • Project impact Analysis • Power of sanction of various officers of works departments </div> <div> <p>Practical Activity:</p> <ol style="list-style-type: none"> 1. Prepare Project Impact Analysis report of assigned project. </div>		<ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system 	
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Module 2: Develop the Project Plan

Objective of the module: The aim of this module to get knowledge, skills and understanding to develop the Project Plan

Duration: 200 hours

Theory: 80 hours

Practical: 120 hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Specify the individual activities	The trainee will be able to: <ol style="list-style-type: none"> 1. Collect data from estimation of construction project. 2. Identify pre-construction tasks. 3. Identify time dependency of activities- Dummy activities. 4. Divide the work into smaller parts. 5. Define the activities depending on resources. 6. Prepare the list of activities along with normal duration 	<ul style="list-style-type: none"> • Identification of resources • List of 5Ms (Material – Manpower – Machinery – Money – Method) • Objectives of scheduling • Break down of the constructions work in to activities Practical Activity: <ol style="list-style-type: none"> 1. Allocate 5Ms of assigned Project. 	Total: 30hrs Theory: 15hrs Practical: 15hrs	<div>Consumable</div> <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners <div>Non Consumable</div> <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system 	Class room/Lab
LU2: Determine the sequence of the Project activities	The trainee will be able to: <ol style="list-style-type: none"> 1. Identify the activities of construction project. 2. Find out predecessor and successor of each activity. 3. Arrange them in sequence. 	<ul style="list-style-type: none"> • Identification of activities of construction project • Sequence of project activities • Predecessor and successor of activity 	Total: 25hrs Theory: 10hrs Practical: 15hrs	<div>Consumable</div> <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners 	Class room/Lab

		Practical Activity: 1. Sequence the activities of assigned project.		Non Consumable <ul style="list-style-type: none"> White board Multimedia Internet Computer system 	
LU3: Draw a flow diagram	The trainee will be able to: <ol style="list-style-type: none"> Represent each activity with arrows. Draw ellipse/ circles at start and end of activities. Observe the direction of arrows. 	<ul style="list-style-type: none"> Bar chart-time and progress chart Gantt chart Bar chart and explain its limitation CPM. network for a construction project Network time, critical path, free float and total float Work progress charts. 	Total: 25hrs Theory: 10hrs Practical: 15hrs	Consumable <ul style="list-style-type: none"> Notebooks Pencils Erasers Sharpeners 	Class room/Lab
		Practical Activity: 1. Draw CPM of assigned task.		Non Consumable <ul style="list-style-type: none"> White board Multimedia Internet Computer system 	
LU4: Estimate the completion time for each activity	The trainee will be able to: <ol style="list-style-type: none"> Examine the resources for each activity. Estimate the workability of workforce Examine the productivity of machinery. 	<ul style="list-style-type: none"> Rechecking of Resources Examination of machinery and manpower Estimation workability of workforce 	Total: 35hrs Theory: 15hrs Practical: 20hrs	Consumable <ul style="list-style-type: none"> Notebooks Pencils Erasers Sharpeners 	Class room/Lab
				Non Consumable	

	<p>4. Determine the activities normal duration.</p> <p>5. Write down time required to complete each activity.</p>	<ul style="list-style-type: none"> • Relation between time and activities <p>Practical Activity:</p> <p>1. Find out the activities normal duration and write time required to complete each activity of assigned task.</p>		<ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system 	
<p>LU5: Prepare Project Time Management plan</p>	<p>The trainee will be able to:</p> <p>1. Perform forward pass by formula at each project activities.</p> <p>2. Write Early Start Time (EST) and Early Finish Time (EFT) for each activity.</p>	<ul style="list-style-type: none"> • Types of Floats in CPM <ul style="list-style-type: none"> ◦ Zero Float ◦ Free Float ◦ Slack Float, etc. • Early Start Time (EST) and Early Finish Time (EFT) • Late Start Time (LST) and Late finish Time (LFT) 	<p>Total: 30hrs</p> <p>Theory: 10hrs</p> <p>Practical: 20hrs</p>	<p>Consumable</p> <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners <p>Non Consumable</p> <ul style="list-style-type: none"> • White board • Multimedia 	Class room/Lab

	<ol style="list-style-type: none"> 3. Perform backward pass by formula at each project activities. 4. Write Late Finish Time (LFT) and Late Start Time (LST) for each activity. 5. Level the resources of project. 6. Apply constraints due to resources, time, environment, and season. 7. Calculate float/ slack time for each activity. 8. Decide the critical path of project- activities with zero float/ slack time. 9. Calculate the duration of project for completion. 	Practical Activity: <ol style="list-style-type: none"> 1. Draw a CPM diagram by using Forward and Backward pass formula 		<ul style="list-style-type: none"> • Internet • Computer system 	
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LU6: Expedite/crash progress of project	The trainee will be able to: <ol style="list-style-type: none"> 1. Enhance workforce and machinery for activities. 2. Enhance daily working hours. 3. Assess the impact of each activity on project cost. 4. Calculate revised critical durations for activities. 5. Calculate time for completion of project. 	<ul style="list-style-type: none"> • Analysis of 5Ms (Material – Manpower – Machinery – Money – Method) • Assessment of Impact Analysis • Amendments in CPM and Crash Progress Program <hr/> Practical Activity: <ol style="list-style-type: none"> 1. Calculate revised critical durations for each activity and completion time of assigned project. 	Total: 30hrs Theory: 10hrs Practical: 20hrs	<div>Consumable</div> <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners <div>Non Consumable</div> <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system 	Class room/Lab
LU7: Update the CPM diagram as the project progresses	The trainee will be able to: <ol style="list-style-type: none"> 1. Record actual time duration on flow diagram 2. Calculate the actual cost. 	<ul style="list-style-type: none"> • PC-IV Performa • Project Completion Report <hr/> Practical Activity: <ol style="list-style-type: none"> 1. Prepare a project Completion Report as per actual status of assigned project. 	Total: 25hrs Theory: 10hrs Practical: 15hrs	<div>Consumable</div> <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners <div>Non Consumable</div> <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system 	Class room/Lab

Module 3: Supervise on-site projects

Objective of the module: The aim of this module to get knowledge, skills and understanding to Supervise on-site projects.

Duration: 300 hours

Theory: 60 hours

Practical: 240 hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Determine quality requirements	The trainee will be able to: <ol style="list-style-type: none"> Determine quality objectives, standards and levels, with input from competent authority as per Quality Management Plan Establish Quality Management methods, techniques and tools Identify quality criteria from a competent authority and communicate to stakeholders Ensure clarity of understanding and achievement of quality and overall project objective Implement agreed quality requirements in the project 	<ul style="list-style-type: none"> Quality Management Plan Quality management theory, techniques, tools and methodologies Roles and responsibilities in project management- sub-engineer regarding works, store and account Understanding and achievement of project objective 	Total: 75hrs Theory: 15hrs Practical: 60hrs	<div>Consumable</div> <ul style="list-style-type: none"> Notebooks Pencils Erasers Sharpeners <div>Non Consumable</div> <ul style="list-style-type: none"> White board Multimedia Internet Computer system 	Class room/Lab
		Practical Activity: <ol style="list-style-type: none"> Prepare a project Plan as per quality requirement and performance measurement. 			

	plan and performance measurement				
LU2: Implement Quality Assurance processes	The trainee will be able to: <ol style="list-style-type: none"> 1. Measure results of project activities 2. Check product performance throughout the project life cycle as per quality standards 3. Identify causes of unsatisfactory results, in consultation with client 4. Recommend appropriate actions to competent authority for quality outcomes 5. Conduct inspections of quality processes and quality control results as per quality standards 6. Maintain a Quality Management System (QMS) 	<ul style="list-style-type: none"> • Need for inspection of works • Duties of various inspecting officers • Use of site order book • Principles of supervision • Need and methods of quality control • Points to be considered in enforcing specifications • Necessity for sampling and testing of materials • Methods for managing and improving performance • Relevant legislation codes and national standards • Quality Management System (QMS) • Causes of failure/unsatisfactory work 	Total: 150hrs Theory: 30hrs Practical: 120hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners Non Consumable <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • PPEs (Safety glasses, Ear muffs/ear plugs, Protective Gloves, Cap, Safety shoes etc.) 	Class room/Lab

	for effective communication of quality issues	Practical Activity: <ol style="list-style-type: none"> 1. State causes of failure/unsatisfactory work 2. Prepare a QMS report as per assigned project. 			
LU3: Perform Project Defect Analysis (PDA)	The trainee will be able to: <ol style="list-style-type: none"> 1. Implement agreed changes in project life cycle to ensure continuous quality improvement 2. Review project outcomes against project success criteria 3. Identify project drawbacks 4. Recommend improvement 	<ul style="list-style-type: none"> • Project Defect Analysis (PDA) • PC5 (Annual operational Report) • Project Success and Drawbacks • Project beneficial recommendations/improvements Practical Activity: <ol style="list-style-type: none"> 1. Prepare a PC5 report as per assigned project. 	Total: 75hrs Theory: 15hrs Practical: 60hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners Non Consumable <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • Printer 	Class room/Lab

Module 4: Plan the Project in Primavera P6

Objective of the module: The aim of this module to get knowledge, skills and understanding to Plan the Project in Primavera P6

Duration: 150 hours

Theory: 60 hours

Practical: 90 hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Perform Basic operation in Primavera P6	The trainee will be able to: <ol style="list-style-type: none"> 1. Load & unload primavera P6 Software. 2. Prepare interface of software 3. Customise P6 Screen Layout 4. Work Breakdown Structure (WBS) 	<ul style="list-style-type: none"> • Introduction to Primavera P6 • Interface of software • Physical performance to Customised screen layout. • Work Breakdown Structure (WBS) 	Total: 32hrs Theory: 11hrs Practical: 21hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • Pen 	Class room/Computer Lab
		Practical Activity: <ol style="list-style-type: none"> 1. Load Primavera P6 Software and prepare interface according to the assigned task. 2. Prepare a Gantt Chart of assigned task in Primavera P6. 		Non Consumable <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • Printer 	

LU2: Perform Project Activities Scheduling in Primavera P6	The trainee will be able to: <ol style="list-style-type: none"> 1. Add Project in Primavera 2. Create WBS of project in Primavera. 3. Create Activities of project in Primavera. 4. Create Relationships between activities of project in Primavera. 5. Create Schedule of activities of project in Primavera. 6. Display Gantt Chart 	<ul style="list-style-type: none"> • Display Gantt Chart • Types of Activities • Relationships between activities of project in Primavera • Scheduling of activities of project in Primavera. Practical Activity: <ol style="list-style-type: none"> 1. Create WBS of assigned task in Primavera. 	Total: 36hrs Theory: 15hrs Practical: 21hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • Pen Non Consumable <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • Printer 	Class room/Computer Lab
LU3: Perform Project Resources Costing & Planning in Primavera P6	The trainee will be able to: <ol style="list-style-type: none"> 1. Add constraints of activities of project 2. Create Calendar for activities of project 3. Assign Calendars to activities of project 4. Add Resources of activities of project 5. Assign Resources of activities of project 6. Add Cost of activities of 	<ul style="list-style-type: none"> • Constraints of activities Work calendar, work/non-work days, working hours, etc. • Roles and Hourly Rates • Resources of activities of project • Baseline process for Project. • Critical Path Method (CPM) • Program Evaluation and Review Technique (PERT) Analysis 	Total: 45hrs Theory: 18hrs Practical: 27hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • Pen Non Consumable <ul style="list-style-type: none"> • White board • Multimedia • Internet 	Class room/Computer Lab

	project 7. Analyse Resources of activities of project 8. Perform Baseline process for Project.	Practical Activity: 1. Create Calendar for activities of project in Primavera P6. 2. Draw CPM/PERT of assigned project in Primavera P6.		<ul style="list-style-type: none"> • Computer system • Printer 	
LU4: Manage Project in Primavera P6	The trainee will be able to: 1. Status the Project 2. Prepare Mitigation plan of the project	<ul style="list-style-type: none"> • Impact Analysis • Mitigation techniques • Crash program 	Total: 37hrs Theory:16hrs Practical:21hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • Pen 	Class room/Computer Lab
		Practical Activity: 1. Prepare Mitigation plan of project in Primavera P6.		Non Consumable <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • Printer 	

Module 5: Create Technical Documentation

Objective of the module: The aim of this module to get knowledge, skills and understanding to Create Technical Documentation

Duration: 150 hours

Theory: 50 hours

Practical: 100 hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Identify and analyse documentation requirements and client needs	The trainee will be able to: <ol style="list-style-type: none"> 1. Consult with client to identify documentation requirements 2. Interpret and evaluate documentation requirements 3. and confirm details with client 4. Investigate industry and documentation standards for requirements 5. Define and document the scope of work to be produced 6. Consult with client to validate and confirm the scope of work 	<ul style="list-style-type: none"> • Content features, such as clarity and readability • Document design, web design and usability • Functions and features of templates and style guides • Instructional design principles • Organizational policies, procedures and standards that cover document design. 	Total: 30hrs Theory: 10hrs Practical: 20hrs	<div>Consumable</div> <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners <div>Non Consumable</div> <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system 	Class room/Lab

LU2: Design documentation	The trainee will be able to: <ol style="list-style-type: none"> 1. Identify information requirements with reference to layout and document structure 2. Create document templates and style guides consistent with information requirements 3. Conduct a review of the system in order to understand its functionality 4. Extract content that meets information requirements according to copyright restrictions 5. Develop the structure of the technical documentation giving focus to the flow of information, style, tone and content format 6. Validate the technical documentation structure with the client 	<ul style="list-style-type: none"> • Reference to layout and document structure • Document templates and style guides • Copyright restrictions • Technical documentation structure 	Total: 30hrs Theory: 10hrs Practical: 20hrs	<div>Consumable</div> <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners <div>Non Consumable</div> <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • PPEs 	Class room/Lab
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LU3: Develop documentation	The trainee will be able to: <ol style="list-style-type: none"> 1. Write technical documentation based on the template and scope of work using the information gathered 2. Translate technical terminology into plain English where appropriate 3. Apply content format and style according to documentation standards and templates 	<ul style="list-style-type: none"> • Technical documentation based on the template and scope of work • Technical terminologies • Documentation standards 	Total: 30hrs Theory: 10hrs Practical: 20hrs	<div>Consumable</div> <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners <div>Non Consumable</div> <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • Safety manuals 	Class room/Lab
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LU4: Evaluate and edit documentation	The trainee will be able to: <ol style="list-style-type: none"> 1. Submit technical documentation to appropriate person for review 2. Gather and analyse feedback 3. Incorporate alterations into the technical documentation 4. Edit the technical documentation for technical and grammatical accuracy 	<ul style="list-style-type: none"> • Review of technical documentation • Analysis of feedback • Editing of technical documentation 	Total: 30hrs Theory: 10hrs Practical: 20hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners Non Consumable <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system 	Class room/Lab
LU5: Prepare documentation for publication	The trainee will be able to: <ol style="list-style-type: none"> 1. Check that the completed technical documentation meets client requirements and scope of work 2. Submit the technical documentation to appropriate person for approval 3. Prepare the technical documentation for publication and distribution using appropriate channels 	<ul style="list-style-type: none"> • Client requirements and scope of work • Publication and distribution of technical documentation using appropriate channels 	Total: 30hrs Theory: 10hrs Practical: 20hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners Non Consumable <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system 	Class room/Lab

Module 6: Develop Entrepreneurial Skills

Objective of the module: The aim of this module to get knowledge, skills and understanding to Develop Entrepreneurial Skills.

Duration: 50hours

Theory: 10 hours

Practical: 40 hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1: Develop a business plan	<p>The trainee will be able to:</p> <ol style="list-style-type: none"> Conduct a market survey to collect following information <ul style="list-style-type: none"> Customer /demand Tools, equipment, machinery and furniture with rates Raw material Supplier Credit / funding sources Marketing strategy Market trends Overall expenses Profit margin Select the best option in terms of cost, service, quality, sales, profit margin, overall expenses Compile the information collected through the 	<ul style="list-style-type: none"> Explain market survey Make questionnaire for survey including <ul style="list-style-type: none"> Customer /demand Tools, equipment, machinery and furniture with rates Raw material Supplier Credit / funding sources Marketing strategy Market trends Overall expenses Profit margin Explain options in business plan regarding(cost, service, quality, sales, profit margin, overall expenses) and include following: 	<p>Total: 36hrs</p> <p>Theory: 25hrs</p> <p>Practical: 11hrs</p>	<p>Consumable</p> <ul style="list-style-type: none"> Notebooks Pencils Erasers Sharpener Pen Coolant Cutting tools Cleaning brush Cotton rags <p>Non Consumable</p> <ul style="list-style-type: none"> White board Multimedia Internet Computer system Measuring tools CNC Lathe machine 	Class room/Lab

	market survey, in the business plan format	<ul style="list-style-type: none"> ○ Tools, equipment, machinery and furniture with rates ○ Raw material ○ Supplier ○ Credit / funding sources ○ Marketing strategy ○ Market trends ○ Overall expenses ○ Profit margin • Enlist the information collected through survey 		<ul style="list-style-type: none"> • PPEs' 	
		<p>Practical Activity:</p> <ol style="list-style-type: none"> 1. Design a questionnaire to find market trends in terms of demand 2. Make business plan Including: <ul style="list-style-type: none"> ○ Tools, equipment, machinery and furniture with rates ○ Raw material ○ Supplier ○ Credit / funding sources ○ Marketing strategy ○ Market trends ○ Overall expenses ○ Profit margin 			

LU2: Collect information regarding funding sources	The trainee will be able to: <ol style="list-style-type: none"> 1. Identify the available funding sources based on their terms and conditions, maximum loan limit, payback time, interest rate 2. Choose the best available option according to investment requirement 3. Prepare documents according to the loan agreement requirement 4. Include the information of funding sources in the business plan 	<ul style="list-style-type: none"> • Explain the funding sources based on their terms and conditions <ul style="list-style-type: none"> ◦ maximum loan limit ◦ payback time ◦ interest rate Practical Activity: <ol style="list-style-type: none"> 1. Decide a product and then find funding sources based on their terms and conditions, maximum loan limit, payback time, interest rate 	Total: 13hrs Theory: 05hrs Practical: 08hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • Pen • Coolant • Cutting tools • Cleaning brush • Cotton rags • PPEs' Non Consumable <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • Measuring tools • CNC Lathe machine 	Class room/Lab
LU3: Develop a marketing plan	The trainee will be able to: <ol style="list-style-type: none"> 1. Make a marketing plan for the business including product, price, placement, 	<ul style="list-style-type: none"> • Explain market plan with the 7P's of marketing including product, price, placement, 	Total: 45hrs Theory: 05hrs Practical: 40hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers 	Class room/Lab

	<p>promotion, people, packaging and positioning</p> <p>2. Include the information of marketing plan in the business plan</p>	<p>promotion, people, packaging and positioning</p> <ul style="list-style-type: none"> • Explain 7'Cs of business communication (clarity, correctness, conciseness, courtesy, concreteness, consideration and completeness) • Different modes of communication and their application in the industry • Specific business terms used in the industry • Enlist the available funding sources • Explain how to get loan to start a new business • Explain market survey and its tools e.g.: questionnaire, interview, observation etc. • Market trends for specific product offering • Main elements of business plan • How to fill the business plan format 		<ul style="list-style-type: none"> • Sharpeners • Pen • Coolant • Cutting tools • Cleaning brush • Cotton rags • PPEs' <p>Non Consumable</p> <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • Measuring tools • CNC Lathe machine 	
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		Practical Activity: <ol style="list-style-type: none"> 1. Do mock activity explaining modes of communication in class 2. Do mock interview between business people regarding new business 			
LU4: Develop basic business communication skills	The trainee will be able to: <ol style="list-style-type: none"> 1. Communicate with internal customers e.g.: labor, partners and external customers e.g.: suppliers, customers etc., using effective communication skills 2. Use different modes of communication to communicate internally and externally e.g.: presentation, speaking, writing, listening, visual representation, reading etc. 3. Use specific business terms used in the market 	<ul style="list-style-type: none"> • Explain internal and external communication • Explain communication and their application in the industry • Specific business communication terms used in the industry 	Total: 45hrs Theory: 05hrs Practical: 40hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners • Pen • Coolant • Cutting tools • Cleaning brush • Cotton rags • PPEs' Non Consumable <ul style="list-style-type: none"> • White board • Multimedia • Internet • Computer system • Measuring tools 	Class room/Lab

				<ul style="list-style-type: none">• CNC Lathe machine	
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Module 7: Practice Professionalism

Objective of the module: The aim of this module to get knowledge, skills and understanding to Practice Professionalism

Duration: 200 hours **Theory:** 70 hours **Practical:** 130 hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU 1 Develop a business plan	The trainee will be able to: 1. Conduct a market survey to collect following information <ul style="list-style-type: none"> Customer /demand Tools, equipment, machinery and furniture with rates Raw material Supplier Credit / funding sources Marketing strategy 	<ul style="list-style-type: none"> Describe market survey and its tools e.g.: questionnaire, interview, observation etc. Explain elements of business plan State the procedure to fill the business plan format 	Total: 26hrs Theory: 06hrs Practical: 20hrs	<div>Consumable</div> <ul style="list-style-type: none"> Notebooks Pencils Erasers Sharpeners <div>Non Consumable</div> <ul style="list-style-type: none"> White board Multimedia 	Class Room/Simulated environment

	<ul style="list-style-type: none"> ○ Market trends ○ Overall expenses ○ Profit margin <ol style="list-style-type: none"> 2. Select the best option in terms of cost, service, quality, sales, profit margin, overall expenses 3. Compile the information collected through the market survey, in the business plan format 	Practical Activity: <ol style="list-style-type: none"> 1. Conduct market survey and formulate business plan in terms of feasibility, investment potential, risk, and completeness. 			
LU 2 Collect information regarding	The trainee will be able to: <ol style="list-style-type: none"> 1. Identify the available funding sources based on their terms and conditions, maximum 	<ul style="list-style-type: none"> • Explain different funding sources • Describe the documents required to get loan to start a new business 	Total: 26hrs Theory: 06hrs Practical: 20hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners 	Class Room/Simulated environment

funding sources	loan limit, payback time, interest rate 2. Choose the best available option according to investment requirement 3. Prepare documents according to the loan agreement requirement 4. Include the information of funding sources in the business plan	Practical Activity: 1. Prepare the documents for financial feasibility for external investment / loan for the business plan. 2. Prepare loan documents.		Non Consumable <ul style="list-style-type: none"> • White board • Multimedia 	
LU 3 Develop a marketing plan	The trainee will be able to: 1. Make a marketing plan for the business including product, price, placement, promotion, people, packaging and positioning	<ul style="list-style-type: none"> • Prepare the product promotion strategy • State elements of business plan • Describe 5 Ps of marketing • Prepare human resource strategy plan. 	Total: 19hrs Theory: 04hrs Practical: 15hrs	Consumable <ul style="list-style-type: none"> • Notebooks • Pencils • Erasers • Sharpeners Non Consumable <ul style="list-style-type: none"> • White board • Multimedia 	Class Room/Simulated environment

	2. Include the information of marketing plan in the business plan	Practical Activity: 1. Devise marketing strategy for product promotion			
LU 4 Develop basic business communication skills	The trainee will be able to: 1. Communicate with internal customers e.g.: labor, partners and external customers e.g.: suppliers, customers etc., using effective communication skills 2. Use different modes of communication to communicate internally and externally e.g.: presentation, speaking,	<ul style="list-style-type: none"> Describe 7Cs of business communication Explain different modes of communication and their application in the industry State business terms used in the industry Describe organization's procedures and policy related to information and communication systems, protocol and procedures 	Total: 09hrs Theory: 04hrs Practical: 05hrs	Consumable <ul style="list-style-type: none"> Notebooks Pencils Erasers Sharpeners Non Consumable <ul style="list-style-type: none"> White board Multimedia 	Class Room/Simulated environment

	<p>writing, listening, visual representation, reading etc.</p> <p>3. Use specific business terms used in the market</p>	<p>Practical Activity:</p> <ol style="list-style-type: none"> 1. Practice to prepare a report about shortage of labour. 2. Practice to play a role to communicate with customer about the product. 			
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General Assessment Guidance for *Digging Operation Supervisor*

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 a Digging Operation Supervisor include:

- Work performances, for example perform basic communication, maintain personal health, hygiene and safety and perform basic computer operations
- Demonstrations, for example Identifying Electrical Circuits and Measurements
- 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 create electrical circuits and how they can measure these circuits

- Paper-based tests, such as multiple choice or short answer questions on communication at work place policy and procedures, Electrical Circuits and Measurements
- Indirect assessment is the method used where the performance could not be watched and evidence is gained indirectly.

Examples for indirect assessment of a Digging Operation Supervisor include:

- Work products, such as preparing and handling documents, perform some procedures of Milling

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 documentation or identifying Electrical Circuits and Measurements are to be assessed and certificated, the assessment should involve performance criteria that are directly related to that documentation activity. An interview about the identifying Electrical Circuits and Measurements 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 *Digging Operation Supervisor*

This curriculum consists of 11 modules:

- **Module 1:** Develop Project Management Life Cycle
- **Module 2:** Develop the Project Plan
- **Module 3:** Supervise on-Site projects
- **Module 4:** Plan the Project in Primavera P6
- **Module 5:** Create Technical Documentation
- **Module 6:** Develop entrepreneurial skills
- **Module 7:** Practice Professionalism

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 are.

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.	Hardness Testers	1
5.	Universal testing machine(UTM)	1
6.	Impact Testing Machines	1
7.	Steel Rulers	10
8.	Tri Square	10
9.	Inside Vernier Caliper	10
10.	Odd leg Vernier Caliper	10
11.	Trammel Vernier Caliper	10
12.	Outside Vernier Caliper	10
13.	Vernier Depth gauge	5
14.	Vernier Bevel protractor	5
15.	Thread gauges	5
16.	Screw pitch gauges	5
17.	Fillet gauges	5

18.	Feeler gauges	5
19.	Vernier Height gauge	5
20.	Dial indicators with magnetic stand	5
21.	Vernier Micrometer	5
22.	Inside Micrometer	5
23.	Outside Micrometer	10
24.	Depth Micrometer	5
25.	Snap Gauge set	2
26.	Dial Bore Gauge	5
27.	Set of Adjustable Wrench	5
28.	Set of Spanners (Open end, Ring)	5 each
29.	Pipe wrench	2
30.	L-key sets	5
31.	Nose pliers	5
32.	Grip pliers	5
33.	Crawler Excavator	5
34.	Wheel Excavator	5
35.	Wrenches	5
36.	Pliers	5
37.	Screw driver (Positive and negative)	5
38.	Hammer	5

39.	Vice grip	5
40.	Grease gun	5 each
41.	Paint brush	10
42.	Steel brush	25
43.	Crawler Excavator	10
44.	Measuring tape	10
45.	High pressure washer	5
46.	Air compressor	5
47.	Rigid and articulated dump truck (Off road)	5
48.	Dump truck (On road)	10 set
49.	Hopper	10
50.	Conveyor	10
51.	Vernier caliper (out, inside)	5
52.	Torque gauge	5
53.	Steel rule	5
54.	Multi-meter	5
55.	Thermometers	5
56.	Spanner set	10 packs
57.	Socket set	1
58.	ST(special service Tool)	1
59.	Drilling Machines	1

60.	Location Determining Devices	1
61.	Digging slant determining devices	1
62.	Communication Devices	10
63.	Sample Boxes	10
64.	Exploration and Scanning Devices	2
65.	Drawing board	25

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

Credit Values

The credit value of the National Certificate Level 2 in Dies & Digging Operation Supervisor 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:

Competency Standard	Estimate of hours	Credit
A. Develop Project Management Life Cycle	100	10
B. Develop the Project Plan	200	20
C. Supervise on-Site projects	300	30
D. Plan the Project in Primavera P6	150	15
E. Create Technical Documentation	150	15
F. Develop entrepreneurial skills	100	10
G. Practice Professionalism	200	20