

GENERAL ELECTRICIAN

Trainer Guide

National Vocational
Certificate Level 2

Version 1 - July 2015

Published by

National Vocational and Technical Training Commission
Government of Pakistan

Headquarter

Plot 38, Kirthar Road, Sector H-9/4, Islamabad, Pakistan
www.navttc.org

Responsible

Director General Skills Standard and Curricula, National Vocational and Technical Training Commission
National Deputy Head, TVET Reform Support Programme, Deutsche Gesellschaft für Internationale
Zusammenarbeit (GIZ) GmbH

Layout & design

SAP Communications

Photo Credits

TVET Reform Support Programme

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This document has been produced with the technical assistance of the TVET Reform Support Programme, which is funded by the European Union, the Embassy of the Kingdom of the Netherlands, the Federal Republic of Germany and the Royal Norwegian Embassy and has been commissioned by the German Federal Ministry for Economic Cooperation and Development (BMZ). The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH in close collaboration with the National Vocational and Technical Training Commission (NAVTTTC) as well as provincial Technical Education and Vocational Training Authorities (TEVTAs), Punjab Vocational Training Council (PVTC), Qualification Awarding Bodies (QABs) and private sector organizations.

Document Version

July, 2015

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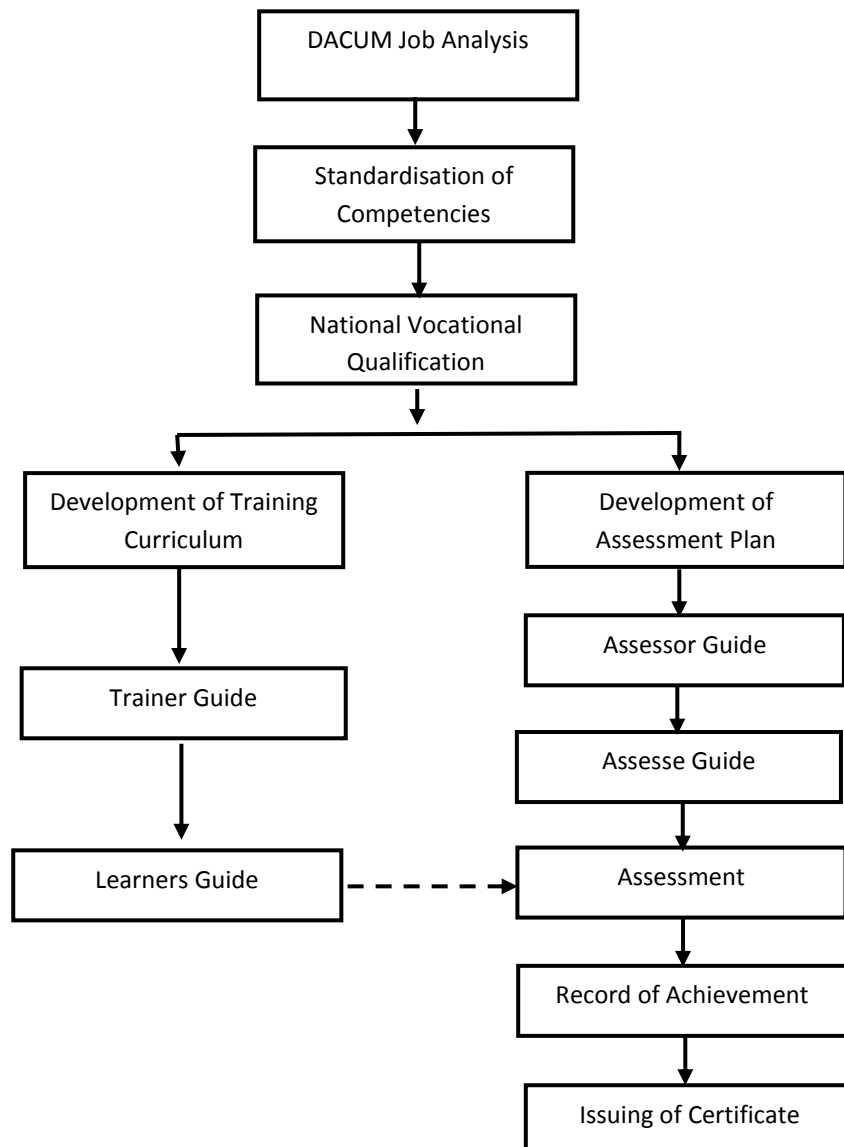
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INTRODUCTION

This Guide supports the Competency-Based Training Curricula that will enable the trainees to achieve the competency standards that have been set by the relevant industry group.

The NVQF Competency-Based Training Curricula along with the associated Training Guides and the Assessment Guides are all developed from the skill competency standards established by the Industry Advisory Group (IAG).

Figure 1 outlines the process of developing the competencies, developing the curriculum and the assessment requirements, and delivering the training program and the assessments necessary to certify achievement of the competencies.



The Trainer Guide provides guidelines and instructions to Trainers on the approaches that are required and on the organisation and delivery of the curriculum training program.

Curriculum

The Curriculum Manual is included in the Training and Learning Materials Package.

The curriculum is organised as a series of modules. Each module is broken down into a series of Learning Units. Each Learning Unit includes Learning Outcomes, Learning Elements, an estimate of the time needed, a list of materials required and the location for the learning to take place.

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials needed	Location

Lesson Plans

The Trainer will need to develop a coherent set of lesson plans for each module of the curriculum. This Guide includes a Lesson Plan Template. The Lesson Plans must be filed for later review if necessary.

Assessment

It is necessary to assess the knowledge and skills of the trainees at the completion of each module. (See the Assessment Guide for further details)

Evaluation of Training Material

Trainers are invited to evaluate the Training Materials based on their experience of delivering the training. A template is provided to assist.

EVALUATION OF TRAINING MATERIAL

The trainers/instructors who implement this training material can inform NAVTTC promptly of any shortcomings in training material on the following format. Please consider it as one of your responsibilities.

Format

Trade:			
Training Material	Module Title & Module Code	Learning Unit Title & Learning Unit Code	Suggested amendments/ feedback/proposal
Trainer Guide			
Learner Guide			
Trainer Name:		Training Centre:	
Signature of Trainer:		Date:	

GUIDELINES FOR WRITING LESSON PLAN

The template for lesson plan has been provided at next page. These guidelines are for trainers for writing their own lesson plans which are as follows:

1. Introduce yourself and the Learning Unit, and state the Learning Outcomes of the session clearly to activate attention of learners.
2. In **Introduction** part of lesson plan state the Learning Objectives of the lesson. This allows the learners to organize their thoughts on what they will learn and to perform. Also state some questions to recall prior knowledge of learners to arouse their interest and motivation.
3. In **Body** part of lesson plan present the new information or material that is to be learned. Demonstration of a skill relevant with the Learning Unit is also stated here. Also mention the teaching and learning methods for each learning element from *Trainer Guidelines*, the relevant media including handouts, power-point slides, videos, white board and time duration for each activity in the relevant columns.
4. In **Conclusion** part list the strategies used for summarizing and reviewing the lesson delivered. Also mention the strategies for formative assessment to ensure that the transfer of knowledge and skill has been achieved.

LESSON PLANS

Dear Instructors,

Model Lesson Plans for one module have been provided in this trainer guide. A format and guidelines for writing Lesson Plans have also been provided in the succeeding pages. You are advised to prepare your own lesson plans for the remaining Learning Units using the suggested format and guidelines.

LESSON PLAN - 1

Module A	ENSURE PERSONAL SAFETY		
Learning Unit	A1: WEAR INSULATED GLOVES AND SHOES.		
Learning Outcomes			
<ul style="list-style-type: none"> • Understand different types of insulated gloves and shoes. • Wear safety gloves as per safety instructions. • Understand Basic safety instructions at workplace 			
Methods	Key Notes	Media	Time
Introduction			
Illustrative Talk	<ul style="list-style-type: none"> - Introduce to the Learning unit - Grasp Learner's attention - Create interest among the learners about the topic and its importance <p>Tell them about the following learning objectives:</p> <ul style="list-style-type: none"> - Basic safety instructions at workplace. - Importance of Personal Protective Equipment (PPE). - Importance of insulated gloves and shoes at work environment. - Types of safety gloves. 	Learner's guidelines, handbook, Whiteboard & multimedia	15 Min
Main Body			
Illustrative Talks	<ul style="list-style-type: none"> - Explain learners about Importance of safety, safety measurements Importance of OHS procedure. - Basic safety instructions at workplace. - Importance of Personal Protective Equipment (PPE). - Importance of insulated gloves and shoes. - Types of safety gloves and safety shoes. - Limitation of insulation w.r.t current and Voltage. 	Learner's guidelines, handbook, Whiteboard, multimedia, visuals, notebooks, pen/pencils, Studio/lab	2 Hrs. 45 Min
Demonstration/Lab	Use visual aid to demonstrate the procedures how to use of different safety gloves and safety shoes for an electrician.		
Lab Demonstration	<ul style="list-style-type: none"> - Demonstrate the use of safety gloves and safety shoes at work place. 		

Activity	Learners should demonstrate use of safety gloves and safety shoes at work place individually.		2 Hrs. 15 Min
Conclusion			
Illustrative Talk Question & Answer Session	<ul style="list-style-type: none"> - Summarize the Illustrative Talk by reviewing important facts. - Engage students in Question and answers session to ensure that the learners acquired relevant knowledge. 		15 Min
Total time:			5.5 Hrs.

LESSON PLAN - 2

LESSON PLAN - 2			
Module A	ENSURE PERSONAL SAFETY		
Learning Unit	A2: USE OF SAFETY GLOVES.		
Learning Outcomes			
<ul style="list-style-type: none"> • Select the appropriate safety gloves. • Wear gloves while handling different tools & equipment. • Place safety gloves at appropriate location after using them. 			
Methods	Key Notes	Media	Time
Introduction			
<i>Illustrative Talk</i>	<ul style="list-style-type: none"> - Introduce to the Learning unit - Grasp Learner's attention - Create interest among the learners about the topic and its importance <p>Tell them about the following learning objectives:</p> <ul style="list-style-type: none"> - Select the appropriate safety gloves. - Wear gloves while handling different tools & equipment. - Place safety gloves at appropriate location. 	Learner's guidelines, handbook, Whiteboard & multimedia	15 Min
Main Body			
<i>Illustrative Talks</i>	<ul style="list-style-type: none"> - Explain the learners about Importance of safety, safety measuring tools Importance of OHS - Difference between un-useable and useable safety gloves. - Use of safety gloves for different tasks. - OHS precautions when using safety gloves. - Issues which may arise when using damaged safety gloves. 	Learner's guidelines, handbook, Whiteboard, multimedia, visuals, notebooks, pen/pencils, Studio/lab	2 Hrs. 45 Min
Activity	<ul style="list-style-type: none"> - Ask Learners to discuss today topic in groups. 		2 Hrs. 15 Min
Conclusion			
Illustrative Talk	<ul style="list-style-type: none"> - Summarize the Illustrative Talk by reviewing important facts. 		15 Min
Question & Answer Session	<ul style="list-style-type: none"> - Engage students in Question and answers session to ensure that the learners acquired relevant knowledge. 		
Total time:			5.5 Hrs.

LESSON PLAN - 3

Module A	ENSURE PERSONAL SAFETY		
Learning Unit	A3: USE INSULATED ELECTRICAL TOOLS/KIT.		
Learning Outcomes			
<ul style="list-style-type: none"> • Select the appropriate tools / kit. • Use insulated tools / kit by handling different tools. • Place tools and kit at appropriate location after use. 			
Methods	Key Notes	Media	Time
Introduction			
<i>Illustrative Talk</i>	<ul style="list-style-type: none"> - Introduce to the Learning unit - Grasp Learner's attention - Create interest among the learners about the topic and its importance <p>Tell them about the following learning objectives:</p> <ul style="list-style-type: none"> - OHS precautions when using insulated tools - Difference between insulated and conductive tools. - Different uses of insulated tools. - Hazards of using unsafe tools. - First hand treatment of electric shock. 	Learner's guidelines, handbook, Whiteboard & multimedia	15 Min
Main Body			
<i>Illustrative Talks</i>	<ul style="list-style-type: none"> • Explain learners about Importance of OHS precautions, importance of conducting and insulating materials importance of insulated and conductive tools. - Difference between insulated and conductive tools. - Different uses of insulated tools. - OHS precautions when using insulated tools. - Hazards of using unsafe tools. - First aid treatment of electric shock. 	Learner's guidelines, handbook, Whiteboard, multimedia, visuals, notebooks, pen/pencils, Studio/lab	2 Hrs. 45 Min
<i>Demonstration/Lab</i>	Use visual aid to demonstrate the procedures how to First hand treatment of electric shock performs.		
<i>Lab Demonstration</i>	<ul style="list-style-type: none"> - Demonstrate First aid treatment of electric shock 		

Activity	Learners should demonstrate First aid treatment of electric shock in groups.		2 Hrs. 15 Min
Conclusion			
Illustrative Talk Question & Answer Session	<ul style="list-style-type: none"> - Summarize the Illustrative Talk by reviewing important facts. - Engage students in Question and answers session to ensure that the learners acquired relevant knowledge. 		15 Min
Total time:			5.5 Hrs.

LESSON PLAN - 4

Module A	ENSURE PERSONAL SAFETY		
Learning Unit	A4: USE OF SAFETY MAT AT WORKPLACE.		
Learning Outcomes			
<ul style="list-style-type: none"> • Identify the appropriate safety mat at workplace. • Use safety mat while handling different equipment. • Place safety mat at appropriate location after use. 			
Methods	Key Notes	Media	Time
Introduction			
Illustrative Talk	<ul style="list-style-type: none"> - Introduce to the Learning unit - Grasp Learner's attention - Create interest among the learners about the topic and its importance <p>Tell them about the following learning objectives:</p> <ul style="list-style-type: none"> - Importance of insulated safety mat. - Capacity of different insulated safety mats in accordance with workplace. - Procedure for issuance of safety mat from store. 	Learner's guidelines, handbook, Whiteboard & multimedia	15 Min
Main Body			
Illustrative Talks	<ul style="list-style-type: none"> - Explain learners about Importance of safety mat, insulated safety mat, types of safety mats. - Capacity of different insulated safety mats in accordance with workplace. - Procedure for issuance of safety mat from store. 	Learner's guidelines, handbook, Whiteboard, multimedia, visuals, notebooks, pen/pencils, Studio/lab	2 Hrs. 45 Min
Demonstration/Lab	Use visual aid to demonstrate the procedures how to use of use of safety mat at workplace.		
Lab Demonstration	<ul style="list-style-type: none"> - Demonstrate the use of safety mat at workplace physically in lab. 		
Activity	Conduct study visit in any related work industry .		2 Hrs. 15 Min

Conclusion			
Illustrative Talk	<ul style="list-style-type: none"> - Summarize the Illustrative Talk by reviewing important facts. - Engage students in Question and answers session to ensure that the learners acquired relevant knowledge. 		15 Min
Question & Answer Session			
Total time:			5.5 Hrs.

LESSON PLAN - 5

Module A	ENSURE PERSONAL SAFETY		
Learning Unit	A5 SWITCH OFF MAIN POWER SUPPLY WHILE WORKING..		
Learning Outcomes			
<ul style="list-style-type: none"> • Identify location of main switch. • Turn off the main switch safely. • Tag off / Log off the main switch. • Power off supply safely when needed. 			
Methods	Key Notes	Media	Time
Introduction			
Illustrative Talk	<ul style="list-style-type: none"> - Introduce to the Learning unit - Grasp Learner's attention - Create interest among the learners about the topic and its importance <p>Tell them about the following learning objectives:</p> <ul style="list-style-type: none"> - Basic concept of electrical voltage, current, resistance, power, energy and their units. - Laws of resistance. - Types of main switches - OHS precautions when switching off the main supply. - Issues which may arise during work when main supply is powered on. - 	Learner's guidelines, handbook, Whiteboard & multimedia	15 Min
Main Body			
Illustrative Talks	<ul style="list-style-type: none"> - Explain learners about Importance of electricity, definition of electricity, basic electrical concept voltage, current, resistance, power, energy and their units. - Laws of resistance. - Types of main switches - OHS precautions when switching off the main supply. - Issues which may arise during work when main supply is powered on Voltage. 	Learner's guidelines, handbook, Whiteboard, multimedia, visuals, notebooks, pen/pencils, Studio/lab	2 Hrs. 45 Min
Activity	Ask Learners to discuss today topic in groups..		2 Hrs. 15 Min
Conclusion			

Illustrative Talk Question & Answer Session	<ul style="list-style-type: none"> - Summarize the Illustrative Talk by reviewing important facts. - Engage students in Question and answers session to ensure that the learners acquired relevant knowledge. 		15 Min
Total time:			5.5 Hrs.

	<p>line.</p> <ul style="list-style-type: none"> • Use of different safety gloves and safety shoes for an electrician. <p>Arrange Questions/Answers Sessions.</p>	Electrical workshop	
LU-3 Maintain safe work area	<p>Give Illustrative Talk and illustrative talk on the following learning elements:</p> <ul style="list-style-type: none"> • Importance of safe working environment. • Work Ethics. • Precautions to prevent electrical hazards/shocks • Difference between insulated and conductive tools. • Different uses of insulated tools. • OHS precautions when using insulated tools. • Hazards of using unsafe tools. <p>Demonstrate the use and handling of electrical and electronic and equipment and safety precautions</p> <p>Ask Learners to practice the use of electrical and electronic equipment. Arrange Questions/Answers Sessions.</p>	<p>Classroom</p> <p>Electrical workshop</p> <p>Electrical workshop</p>	<p>Learning Guide, Presentations, Videos, Illustrations Whiteboard etc</p>
LU-4 Deal with emergency situations.	<p>Give Illustrative Talk and illustrative talk on the following learning elements:</p> <ul style="list-style-type: none"> • Rescue in emergency situations. • Suitable location of First Aid box. • Identify and locate trained First Aide responder <p>Arrange a role play or an activity to show how to use first aid box and rescuing in emergency situations.</p>	Classroom	<p>Learning Guide, Presentations, Videos, Illustrations Whiteboard etc</p>

	<ul style="list-style-type: none"> • Interpretation of drawing/documents. • Checking of pipe fixing. <p>Demonstrate the following techniques:</p> <ul style="list-style-type: none"> • Laying and fixing techniques. • Jointing techniques by using steel wire. <p>Ask Learners to practice in small groups. Arrange Questions/Answers Sessions.</p>	Workshop	Videos, Illustrations Whiteboard etc
LU6: Check all fan box and junction box	<p>Give Illustrative Talk and demonstrate the following procedures:</p> <ul style="list-style-type: none"> • Procedure for laying fan, and junction boxes. • Adjustment methods of point joints and junctions. • Procedure of clearing blockage in fan and junction boxes. <p>Ask Learners to practice in small groups. Arrange Questions/Answers Sessions.</p>	Workshop	Learning Guide, Presentations, Videos, Illustrations Whiteboard etc

Module 03: Perform Measurement of Plan Wiring			
	Suggested Teaching/ Learning Activities	Delivery Context	Media
LU1: Perform measurement of rooms	<p>Give illustrative talk on the following learning elements:</p> <ul style="list-style-type: none"> • Measuring units. • Measuring tools. • Basic mathematical calculations <p>Demonstrate the use of measuring tools as mentioned in learner guide.</p>	<p>Classroom</p> <p>Workshop</p>	Learning Guide, Presentations, Videos, Illustrations Whiteboard etc

LU7:Perform leveling of switch boards (AC light, Light plug, TV)	<p>Give illustrative talk on the following learning elements:</p> <ul style="list-style-type: none"> • Measuring units. • Use of leveling tools. • Leveling techniques. • Basic mathematical calculations. <p>Demonstrate the use of leveling tools and techniques. Give learners an activity to use leveling tools and techniques. Ask Learners to practice in small groups. Arrange Questions/Answers Sessions.</p>	<p>Classroom</p> <p>Workshop</p>	<p>Learning Guide, Presentations, Videos, Illustrations Whiteboard etc</p>
LU8:Perform leveling of room wall lights	<p>Give illustrative talk on the following learning elements:</p> <ul style="list-style-type: none"> • Measuring units. • Use of leveling tools. • Leveling techniques. • Basic mathematical calculations <p>Demonstrate the use of leveling tools and techniques. Give learners an activity to use leveling tools and techniques. Ask Learners to practice in small groups. Arrange Questions/Answers Sessions.</p>	<p>Classroom</p> <p>Workshop</p>	<p>Learning Guide, Presentations, Videos, Illustrations Whiteboard etc</p>
LU9:Perform chiseling with wall cutter	<p>Give illustrative talk on the following learning elements:</p> <ul style="list-style-type: none"> • Uses of wall cutter. • Types of wall cutters. <p>Demonstrate chiseling techniques.</p>	<p>Classroom</p> <p>Workshop</p>	<p>Learning Guide, Presentations, Videos, Illustrations Whiteboard etc</p>

	<p>and electronic appliances. Arrange Questions/Answers Sessions.</p>	Workshop	
LU2: Selection of cables according to room load	<p>Give illustrative talk on the following learning elements:</p> <ul style="list-style-type: none"> • Read the standard specification table for cable/wire. • Load calculation. • Use of Standard Wire gauge (SWG) and Micrometer • Types of Cables/Wires. • Trademarks of cable manufacturing companies like ,New AGE Cable, Pakistan Cable, Dawn Cable, GM Cables etc. • Basic mathematical calculations. • Conductor, Insulator and semi-Conductor. <p>Demonstrate the use of Standard Wire gauge (SWG) and Micrometer. Arrange Questions/Answers Sessions.</p>	<p>Classroom</p> <p>Workshop</p>	<p>Learning Guide, Presentations, Videos, Illustrations Whiteboard etc</p>
LU3: Selection of size of cables according to appliances	<p>Give illustrative talk on the following learning elements:</p> <ul style="list-style-type: none"> • Interpret the Standard specification table for cable/wire. • Procedure for Load calculation. • Types of Cables/Wire. • Trademarks of cable manufacturing companies like, New AGE Cables, Pakistan Cables, Dawn Cables, GM Cables etc. <p>Arrange Questions/Answers Sessions.</p>	Classroom	<p>Learning Guide, Presentations, Videos, Illustrations Whiteboard etc</p>

Module 05: Use of electrical cables/wires

	Suggested Teaching/ Learning Activities	Delivery Context	Media
<p>LU1:Install main distribution board</p>	<p>Give illustrative talk on the following learning elements:</p> <ul style="list-style-type: none"> • Classification of electrical wiring (Domestic, Commercial and Industrial). • Various sizes of distribution board. • Concept of voltage drop. <p>Demonstrate the procedure of fitting of distribution board. Ask Learners to practice. Arrange Questions/Answers Sessions.</p>	<p>Classroom</p> <p>Workshop</p>	<p>Learning Guide, Presentations, Videos, Illustrations Whiteboard etc</p>
<p>LU2:Install earthing connections properly</p>	<p>Give illustrative talk on the following learning elements:</p> <ul style="list-style-type: none"> • Importance of Earthing. • Types of Earthing materials and Earthing components. • Types of testing (Current leakage test, Short circuit test, Insulation test, Continuity test) <p>Demonstrate the procedures of:</p> <ul style="list-style-type: none"> • Techniques and procedure for digging and installation of earthing system. • Techniques and procedure of connecting Earthing system with main distribution box. • Procedure for Earthing system. • Give an activity to learners to install earthing connections correctly. • Arrange Questions/Answers Sessions. 	<p>Classroom</p> <p>Workshop</p>	<p>Learning Guide, Presentations, Videos, Illustrations Whiteboard etc</p>

Module 06: Perform repair and maintenance of electrical appliances

	Suggested Teaching/ Learning Activities	Delivery Context	Media
LU1: Trace fault of Wiring/Appliances	<p>Give illustrative talk on the following learning elements:</p> <ul style="list-style-type: none"> • Types of tools used for identification of faults. • Types of possible wiring faults. • Types of possible electrical appliances related faults. • Techniques to identify faults. • Types of Electrical circuits. • Types of Power Supply. <p>Arrange Questions/Answers Sessions.</p>	Classroom	Learning Guide, Presentations, Videos, Illustrations Whiteboard etc
LU2:Remove Fault (wire cable/switch /circuit breaker)	<p>Give illustrative talk on the following learning elements:</p> <ul style="list-style-type: none"> • Type of Tools for removing faults. • Types of faults. • Types of Electrical circuits (series/parallel). • Market information about availability and rates of spare parts. <p>Demonstrate the following:</p> <ul style="list-style-type: none"> • Techniques and procedure for tracing faults. • Techniques and procedure for rectification of faults. <p>Arrange Questions/Answers</p>	<p>Classroom</p> <p>Workshop</p>	Learning Guide, Presentations, Videos, Illustrations Whiteboard etc

Module 07: Develop professionalism


	Suggested Teaching/ Learning Activities	Delivery Context	Media
LU1: Communicate with co-workers	<p>Give illustrative talk on the following learning elements:</p> <ul style="list-style-type: none"> • Effective communication within and outside the organisation. • Clients and Vendors communication strategy. • Use of electronic and relevant media when required. <p>Ask Learners to practice in small groups. Arrange Questions/Answers Sessions.</p>	Classroom	Learning Guide, Presentations, Videos, Illustrations Whiteboard etc
LU2 : Manage Time	<p>Give illustrative talk on the following learning elements:</p> <ul style="list-style-type: none"> • Importance of time. • Task priorities. • Distribution of work among co-workers. <p>Arrange Questions/Answers Sessions.</p>	Classroom	Learning Guide, Presentations, Videos, Illustrations Whiteboard etc
LU3: Upgrade Skills	<p>Give illustrative talk on the following learning elements:</p> <ul style="list-style-type: none"> • Importance of trends and market research to work role • Development of skill sets over time by way of seminars, workshops and competitions. 	Classroom	Learning Guide, Presentations, Videos, Illustrations Whiteboard etc
LU4: Keep the workplace clean	<p>Give illustrative talk on the following learning elements:</p> <ul style="list-style-type: none"> • Requirements of a clean and well organised workplace. • Effective and efficient organisation of work area. 	Classroom	Learning Guide, Presentations, Videos, Illustrations Whiteboard etc

	<ul style="list-style-type: none"> • Basic work ethics. <p>Ask Learners to practice in small groups. Arrange Questions/Answers Sessions.</p>	Workshop	
LU5: Work in a team	<p>Give illustrative talk on the following learning elements:</p> <ul style="list-style-type: none"> • Importance of being a good team player. • Basic work ethics at workplace. <p>Arrange Questions/Answers Sessions.</p>	Classroom	<p>Learning Guide, Presentations, Videos, Illustrations Whiteboard etc</p>


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