National Vocationaland Technical Training Commission (NAVTTC)

Curriculum
for
Electrical Technician
[Cooprative vocational Training]
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EUROPEAN UNION

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Contents

1. Introduction

The Electrical power and construction industry is one of the leading businesses in Pakistan as well as in Middle East and other part of the world. The industrial growth has created a demand for skilled manpower in Pakistan and abroad. Nowadays, many industries are heavily dependent on electrical power and subsequently on skilled Industrial Electrical Technicians. Electrical Technician play a vital role in the electrical installations repairs, generation and maintenance of electrical equipments. GPATI training scheme has been developed in such a way that training sequences will be in a training center (vocational institute), Complimented by on the job training (OJT) phases on the premises of the employers. The basic course split between training at the institute and OJT is 50-50. Half of the course time will spent at the Vocational Training Institute and the other half will be spent doing OJT. The purpose of this training program is to train electrical technician trade man, who are specialized to perform installation of new electrical systems, Diagnose electrical faults , repairs electrical faults, services and maintenance of already installed electrical equipments at domestic and industrial level. The object of this training is also to train the trainee as per industry requirements and standards. After this training program trainee shall be able to perform the selection of electric materials, installation of electrical wiring (domestic and industrial) estimating, planning, repairing, and troubleshooting and other associated accessories according to the drawings Standards and specifications. This has created an opportunity for skill training in the field ofElectrical Technician, industrial electrician to meet the ever-growing demand of industry. As a consequence, this course has been designed and developed to achieve the objectives of providing appropriate skills.

After completion of vocational training the graduates will have a good balance of technical knowledge, skills, attitude and work experiences, which are the essential elements of any industry. Further, as GPATI is simultaneously integrating work experience through on-the-job Training, the graduates will be able to use the latest technologies to achieve new levels of expertise. This course has been design and developed to achieve its objectives of providing appropriate skills.

1.1 Overall course objective

1. The aim of this program is to produce employable Electrical Technician who could provide intermediate installations, repairs and maintenance services in the field of electrical, including one year on job training at any electrical factory or organization. In addition, this program aims to prepare unemployed youth to find employment in the industries or to enable them in becoming successful as entrepreneur.The prime objective of this course of is to develop and enhance the skill level of the incumbent in the industry.
2. The training program shall be organized in a training institute where the relevant measurement equipment and faculty is available.
3. The training program shall enable the student to enhance their technical skills and to pursue a career path with focus on electrical field as an Electrical Technician either in the industry or as a self-employed by having own electrical workshop.
4. The training program shall enable the student to pursue an electrical technician career path with greater employment skills.
5. The training program shall be produced skilled worker and would help to reduce unemployment and poverty in the society.
6. To produce a capable &skillful workforce as required by the prevailing market demands in Electrical field.
7. To produce work safely, effectively and hygienically in Electric works.
8. To develop ability among the trainees to work in a team environment.
9. To develop characteristics among the trainees such as self-reliance, reliability, responsibility and ability to lead the program in electrical field.
10. To give competency in the field of Electrical technology and its associated elements.

11. To establish coordination among employer's, workers and government relating to human resource development programs.
12. This training program will provide opportunity to those who want to equip themselves with such knowledge and skills which will be helpful for their employment after completing this training of 24 months (12 months in Institute and 12 months on the job training in a company/industry) and would enable them to start their own business with professional approach.
13. Further, this Curriculum is developed by considering the requirements of local and international market and need of the trade enabling the pass-outs to meet the job market to reduce the shortage of Semi-Skilled and Skilled workers in the area.
14. Provide technical and vocational training basis which reflects the requirements of the industry.

1.2 Course competencies

After completion of training the trainees will be able to:

- Develop professionalism associated with the Electrical Technician trade;
- Maintain Safety;
- Interpret Drawings and Layout Electrical Wiring;
- Maintain Tools & Equipment;
- Install Wiring;
- Perform Installations and Assembling of Electrical Appliance / items;
- Install Electrical Appliances / equipment
- Perform Lockout Tag out (LOTO)
- Check machine condition through sensory (senses)
- Perform Inspection of Tools, Equipment and installations
- Fill in Preventive maintenance Performa as per Requirement
- Repair / Replace Faulty Parts
- Maintain record of spare parts for back up services

- Read / Interpret Drawing (Civil, Electrical & communications)
- Perform Wiring (Domestic & Industrial), termination and tagging
- Perform Wire Dressing
- Perform Checking & Testing of electrical wiring
- Read / Interpret Electrical Layout
- Arrange Resources (e.g. Power Supply, Tools & Equipment) for electrical equipment installation/dismantling
- Perform Electrical Panel Installation
- Perform Cable Dismantling
- Perform Electrical Appliances Installation
- Perform Electrical equipment Dismantling
- Perform Earthing
- Provide Power Supply to machine

1.3 Job opportunities

The pass out of this course would be able to:

- Work in small & big construction units as building electrician or electrical technicians.
- Work as Electrical Technician in an electrical company / organization.
- Work as electrician with construction contractor.
- Work as Electrical Technician in Power plants.
- Works as line man /Forman in WAPDA Railways and other State departments.
- Works as Electrical Technician Tach-III in atomic energy.
- Works as generator Operators in any Govt organization or factory/industry.

- Works as Electrical Technician in Golf countries.
- Work as Electrical Technician in Fertilizer industry.
- Work as Electrical Technician in Chemical industry.
- Work as Electrical Technician in Sugar industry.
- Be self-employed by having his own electrical / wiring workshop.
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1.4 Trainee entry level

Individuals who wish to enter this course of study have to comply against the following criteria:

- Grade 10 (Matric) or equivalent;
- Satisfactory completion of appropriate admission assessment test.

1.5 Minimum qualification of trainer

Trainers who wish to offer this program should meet one of the following requirements:

- B.Sc. Engineering and 2 years of relevant industry experience; or
- B-Tech and 2 years of relevant industry experience; or
- Diploma Associate Engineer (DAE) and 5 years relevant industry experience

Trainers offering this program must be computer literate and be conversant with the delivery of competency-based education and training (CBET).

1.6 Teaching strategies in a competency-based environment

Training in a competency-based environment differs from the traditional method of training delivery. It is based on defined competency standards, which are industry oriented.

The traditional role of a trainer is changed and shifts towards the facilitation of training. A facilitator in CBET encourages and assists trainees to learn for themselves. Trainees are likely to work in groups (pairs) and all doing something different. Some are doing practical tasks in the workshop, some writing, some not even in the classroom or workshop but in another part of the building using specialist equipment, working on computers doing research on the Internet or the library. As trainees learn at different pace they might well be at different stages in their learning, thus learning must be tailored to suit individual needs.

The following facilitation methods (teaching strategies) are generally employed in CBET programs

- **Direct Instruction Method:** This might be effective when introducing a new topic to a larger group of trainees in a relative short amount of time. In most cases this method relies on one-way communication, hence there are limited opportunities to get feedback on the trainee's understanding.

- **Discussion Method:** This allows trainees to actively participate in sharing knowledge and ideas. It will help the trainer to determine whether trainees understand the content of the topic. On the other hand, there is a possibility of straying off topic under discussion and some trainees dominating others on their views.

- **Small Group Method:** Pairing trainees to help and learn from each other often results in faster knowledge/skill transfer than with the whole class. The physical arrangement of the classroom/workshop and individual assessment may be challenging. Analogy method should be in corporate.

- **Problem Solving Method:** This is a very popular teaching strategy for CBET. Trainees are challenged and are usually highly motivated when they gain new knowledge and skills by solving problems (Contingency skills). Trainees develop critical thinking skills and the ability to adapt to new learning situations (Transfer skills). It might be time consuming and because trainees sometimes work individually, they may not learn all the things that they are expected to learn.

- **Research Method:** This is used for workshops and laboratory tasks, field experiments, and case studies. It encourages trainees to investigate and find answers for themselves and to critically evaluate information. It however requires a lot of time and careful planning of research projects for the trainee.

1.7 Medium of instructions

- Urdu, local languages and/or English

1.8 Sequence and delivery of the modules

- The curriculum for Electrical Technician – NVQF level 2, consists of fourteen (14) modules. The delivery of the modules (sequence) is suggested as follows:

- **Module 1:** Maintain Safety

- **Module 2:** Perform Electrical Preventive Maintenance Operations (EPM)

- **Module 3:** Perform Electrical Wiring

- **Module 4:** Install Electrical System

- **Module 5:** Perform Troubleshooting

- **Module 6:** Repair Electrical Equipment

- **Module 7:** Develop Professionalism

- **Module 8:** Computer Skills

- **Module 9:** English Language Skills I

- **Module 10:** English Language Skills II

- **Module 11:** Life Skills I

- **Module 12:** Life Skills II

- **Module 13:** OJT-I

- **Module 14:** OJT-II

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- Learning units within these modules can be delivered interchangeably as stand-alone modules or in an integrated approach.
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1.8 -Sequence of Module:

➢ **Training in Training Center-12 Months;**	➢ **On the Job Training (OJT) in a company-12 months**			➢ **Revision in Training Centre 2-3 Weeks**
➢ Phase-I; Basic Institutional Learning	➢ Phase-III: Advanced Institutional Learning	➢ Phase-II: Basic OJT	➢ Phase-IV: advanced OJT	
➢ ➢ **Module 1**- Maintain Safety ➢ **Module 2**- Perform Electrical Preventive Maintenance Operations (EPM) ➢ **Module 3** Perform Electrical Wiring ➢ ➢ ➢ ➢ **Module 8**- Computer Skills ➢ ➢	➢ ➢ **Module 4**-:Install Electrical System ➢ **Module 5**-:Perform Troubleshooting ➢ **Module 6**-:Repair Electrical Equipment ➢ **Module 7**- Develop Professionalism ➢ ➢ ➢ ➢ ➢ ➢ **Module 10**- English Language Skills-II	➢ ➢ **Module 13:** OJT – I ➢ ➢ Company orientation, HSE procedures & Regulations, Material Used & their selection, PPE, Health Safety & Environment, Overview of workplace as well as Equipment, Inspect the machine/equip ment by using sense, control different equipment, motors	➢ ➢ **Module 14:** OJT – I ➢ ➢ Review of OJT – I, procedures and regulations of the company, Material use and their selection, Domestic wiring ,industrial wiring, control wiring, types of wiring concealed wiring ,open wiring ➢ conduit ducts wiring ,bus way ,Bus bar connections ,prepare wiring	➢ **Review & Preparation for final Examination** ➢

➢ **Module 9**- English Language Skills-I ➢ ➢ ➢ ➢ **Module 11-** Life Skills-I	➢ ➢ ➢ ➢ **Module 12-** Life Skills-II ➢ ➢	direction motor control, vibration control, temperature sensors, noise sensors, star. ➢ Single phase and three phase motor maintenance, generator service, CT and PT uses, measure electrical parameters,	plan, inspect quality of ➢ cable, Star delta panel wiring, DOL panel wiring ,ATS panel wiring ,reverse forward circuit wiring ➢ , power circuit wiring, HT, LT wirings techniques Repair Electrical Equipment Perform Troubleshooting t, Install Electrical, Develop Professionalism	

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- **1.9 Duration of the course**
- The proposed curriculum is composed of 14 modules, which will be delivered over 3200 hours i.e. six (24) months.
- The distribution of training hours is as follows:
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a) Total Training hours = 3200 Hours

b) Theory = 640Hours (20%)

c) Practical = 2560 Hours (80%)

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- **2. Overview about the programme – (Electrical Technician) –:**
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➢ Module Title	➢ Learning Units	➢ Theory hours	➢ Workshop hours	➢ Timeframe of modules
➢ **Module 1** ➢ Maintain Safety ➢ ➢	1. Apply personal safety measures 2. Apply workplace safety measures 3. Follow Work Permit 4. Maintain Safety of Wiring & Cables 5. Perform Lockout Tag out (LOTO)	➢ 60hrs	➢ 100hr	➢ 160hrs
➢ **Module 2** ➢ Perform Electrical Preventive Maintenance Operations (EPM)	1. Check machine condition through sensory 2. Perform Inspection with Tools & Equipment 3. Fill in Preventive maintenance Performa as per Requirement 4. Repair / Replace Faulty Parts of Equipment 5. Maintain record of spare parts for back up services	➢ 75hrs	➢ 200hrs	➢ 275hrs
➢ **Module 3**	1. Read / Interpret	➢ 60hrs	➢ 160hrs	➢ 220hrs

➢ Perform Electrical Wiring ➢ ➢	Drawing 2. Arrange Resources for electrical wiring 3. Perform Wiring (Domestic & Industrial), termination and tagging 4. Perform Wire Dressing 5. Perform Checking & Testing of electrical wiring			
➢ **Module 4** ➢ Install Electrical System	1. Read / Interpret Electrical Layout 2. Arrange Resources (e.g. Power Supply, Tools & Equipment) for electrical equipment installation/dismantling 3. Perform Electrical Panel Installation 4. Perform Cable Installation 5. Perform Cable Dismantling 6. Perform Electrical Appliances Installation 7. Perform Electrical	➢ 80hrs	➢ 280hrs	➢ 360hrs

	equipment Dismantling 8. Perform Earthing 9. Provide Power Supply to machine			
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➢ **Module 5** ➢ Perform Troubleshooting	1. Obtain Problem Specific Documents (Instructional Manual, Work Order) 2. Perform Fault Diagnosis of the job/machine/equipment (electrical, mechanical, instrumental) Perform post soldering inspection	➢ 45hrs	➢ 100hrs	➢ 145hrs
➢ **Module 6** ➢ Repair Electrical Equipment ➢	1. Repair / Replace faulty Components/parts of electrical equipment/machine/job 2. Prepare Work Completion Report	➢ 45hrs	➢ 120hrs	➢ 165hrs
➢ **Module 7** ➢ Develop Professionalism	1. Plan the task based on the work permit 2. Evaluate quality of work 3. Communicate with others in Urdu and	➢ 60hrs	➢ 00hrs	➢ 60hrs

	English in appropriate terms 4. Upgrade professional skills and knowledge			
➢ **Module 8** ➢ Computer Skills ➢	1. Introduction to Computer 2. MS-Word (Basic to Intermediate) 3. MS-Excel (Basic to Intermediate) 4. MS-PowerPoint (Basic to Intermediate)	➢ 50hrs	➢ 60hrs	➢ 110hrs
➢ **Module 9** ➢ English Language Skills I	1. Introduction to Listening Part I -Listening to Match Information 2. Introduction to Listening Part II -Listening to Respond 3. Introduction to Listening Part III -Following Conversations 4. Introduction to Listening Part IV -Listening for Key Information 5. Introduction to Reading Part I	➢ 60hrs	➢ 00hrs	➢ 60 hrs

	-Reading to Understand the Sequence of a Text 6. Introduction to Reading Part II -Understanding the Text Structures 7. Introduction to Reading Part III -Understanding the Purpose of Text 8. Introduction to Reading Part IV -Reading for Key information ➢ ➢			
➢ **Module 10:** ➢ English Language Skills II	1. Introduction to Writing Part I -Completing a form 2. Introduction to Writing Part II -Correcting errors 3. Introduction to Writing Part III -Communicating ideas and information 4. Introduction to Writing Part IV -Writing a text 5. Introduction to Speaking Part I -Introduction to	➢ 45hrs	➢ 0hrs	➢ 45hrs

	language 6. Introduction to Speaking Part II -Social situations 7. Introduction to Speaking Part III exchanging information and opinion 8. Introduction to Speaking Part IV -Presenting a topic ➢			
➢ **Module 11** ➢ Life Skills I	1. Exploring and Understanding Self 2. Effective Communication 3. Personal Grooming ➢	➢ 30hrs	➢ 0hrs	➢ 30 hrs
➢ **Module 12** ➢ Life Skills II ➢ ➢ ➢	1. Working with Teams 2. Vision and Goal Setting 3. Profession al Development 4. Personal and Social Responsibility	➢ 30hrs ➢	➢ 0hrs	➢ 30 hrs
➢ **Module 13** ➢ OJT-I	➢	➢ 0hrs	➢ 800hrs	➢ 800hrs
➢ **Module 14** ➢ OJT-II	➢	➢ 0hrs	➢ 800hrs	➢ 800hrs

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➢ **3. Electrical Technician– Curriculum Contents**

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➢ **Module 1:**	➢ **Maintain Safety**				
➢ **Objective of the Module:**	➢ On completion of this module the trainee will be able to demonstrate the following competencies according to industry standards and/or requirements: • Maintain Personal Safety • Maintain Safety at Workplace • Maintain Safety of Tools & Equipment • Maintain Safety of Wiring & Cables • Perform Lockout Tag out (LOTO)				
➢ **Duration:**	➢ **Total :** ➢ 160 **hours**		➢ **Theory:** ➢ **60 hours**	➢ **Practice:** ➢ 100 **hours**	
➢ **Learning Unit**	➢ **Learning Outcomes** ➢	➢ **Learning Elements**	➢ **Duration (Hours)**	➢ **Materials Required**	➢ **Learning Place**
➢ **LU-1:**	➢ 1.1	• Type of injuries	➢ **To**	➢ **Non**	➢ **Theo**

➢ **Maintain Personal Safety** ➢	Identify hazards associated with tasks (task hazards analysis) and their removal according to standard format ➢ ➢ ➢ ➢	• Minor injuries and major injuries • Define Henrik triangle • Precautionary measures and there to applications to prevent. • Practical exercises related to personal safety ➢	**tal** ➢ 50Hrs ➢ **Theory** ➢ 20 Hrs ➢ **Practical** ➢ 30 Hrs	**Consumable** • Helmets, • safety shoes • safety goggles, • gloves, • ear plugs, • face masks, • first aid kit, • safety belts, • overall, • fire suit (if necessary), radiation films, • different types of fire extinguishers, • fire hydrants, • fire drills (emergency response), • training manuals related to Task Hazards Analysis (THA) and Henric Triangle • Animation of states of matter	**ry** ➢ Class room ➢ ➢ **Practical** ➢ Lab ➢ Work shop ➢
	➢ 1.2 Interpret work permit in terms of working conditions correctly. ➢ ➢ ➢	• Identify basic hazards associated with - Falling hazards - Fire - Slipping of tools - Short circuits • Interpret work permit requirements - Drawings - Lay outs - Symbols			

	➢ ➢ ➢ ➢ ➢ ➢ ➢ ➢	• Requirements for a safe working environment. • Exercises for interpret - Drawings - Lay outs - Symbols - work permit			
	➢ 1.3 Select personal protective equipment (PPEs) in terms of type and quantity according to work permit. ➢	• Types of personal ➢ protective equipments (PPEs) - gloves - safety shoes - safety helmet - Goggles - Safety belts • Usage of (PPEs) • Importance of (PPEs) • Practical use of PPEs			
	1.4 Ensure normal functioni	• Selection of (PPEs) • Importance of insulated gloves and			

	ng of personal protective equipment at the time of selection ➢ ➢ ➢ ➢	shoes at work environment. • Issues which may arise when using damaged safety gloves. • Ensure insulation check			
	➢ 1.5 Follow standard operating procedures while using (PPEs). ➢ ➢ ➢ ➢	• obtain safety and other regulatory requirements associated with PPEs • Safety requirements, specifications, Hazard identifications using (PPEs). • OHS procedures.			
	➢ 1.6 Ensure	• Importance of safe working place environment.			

	(PPEs) is cleaned and stored at designated place.	• Risk assessment and control processes. • Importance of cleaned and insulated PPEs • Place safety gloves at proper/appropriate location after using them.			

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➢ Learning Unit	➢ Learning Outcomes	➢ Learning Elements	➢ Duration (Hours)	➢ Materials Required	➢ Learning Place

➢ **LU-2:** ➢ **Maintain Safety at Workplace**	➢ 2.1 Perform removal of hazards according to SOP ➢ ➢ ➢ ➢ ➢ ➢	• Safety requirements, and Hazard identifications • Importance of SOP &safe working environment. • Common hazards - Insulation breaks of cable - Guarding or identification of live parts - Grounding - - Electric spark - Lake of self-protection equipment uses - Unawareness • Fire alarm, smoke detectors • Precautions to prevent electrical hazards/shocks • First aid treatment of electric shock • Practical exercises for First aid treatment	➢ **Total** ➢ 30 Hrs ➢ **Theory** ➢ 10 Hrs ➢ **Practical** ➢ 20Hrs	• Fire extinguisher • Fire hydrants, • Smoke detectors, • Fire alarm • Emergency exit plan, PPEs, barriers with barrication tape, Earthquake detectors • SOP for safety	➢ **Theory** ➢ Class room ➢ ➢ **Practical** ➢ Lab ➢ Work shop

➢	➢ 2.2 Barricade work area to restrict entry of unconcerned people	• 5s tools - sort - Set in order - Shine - Standardize - Sustain • site work requirements • Use safety signs and symbols at work area • Display restrict signs and symbols • Lockout procedures • Practical exercises related work activity	➢	➢	➢
	➢ 2.3 Keep workplace clean and tidy	• Different safety signs and symbols use at workplace • Importance of cleaning and housekeeping • Process and procedure to get the work permit • Practical exercises for cleaning at workplace ➢			

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➢ **Learning Unit**	➢ **Learning Outcomes**	➢ **Learning Elements**	➢ **Duration (Hours)**	➢ **Materials Required**	➢ **Learning Place**
➢ **LU-3:** ➢ **Maintain Safety of Tools & Equipment**	➢ 3.1 Select right tools specific to job	• Purpose of tools and equipment • Use of safety tools, equipment and instruments • Selection of tools and equipment for specific job • Practical exercises related to work activity	➢ **Total** ➢ 20Hrs ➢ **Theory** ➢ 5 Hrs	➢ All tools & equipment, safety manuals, SOPs,	➢ **Theory** ➢ Class room ➢ ➢ **Practical** ➢ Lab

	➢ 3.2 Clean tools and equipment after usage for inspection ➢	• Importance of cleaning • Types of tools equipments and materials • Cleaning and housekeeping requirements • OHS requirements for tools and equipment	➢ **Practical** ➢ 15Hrs		➢ Work shop
➢	➢ 3.3 Place tools and equipment at safe and designated location. ➢	• Identify the safety and other regularity requirements for use and placing tools and equipments • Keep tools and equipments at appropriate location. • Practical exercises related to work activity			

	➢ 3.4Verify the readings of instruments against calibrated instrument	• Calibrations of tools and equipments • Adjustments and calibration techniques for instruments • Practical exercises for measuring electrical parameters - Current - Voltages - Resistance - Frequency • Power			

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➢ **Learning Unit**	➢ **Learning Outcomes**	➢ **Learning Elements**	➢ **Duration (Hours)**	➢ **Materials Required**	➢ **Learning Place**
➢ **LU-4:** ➢ Maintain Safety of Wiring & Cables	➢ 4.1 Select the cable according to connected load ➢	• Define the term - Wire - Cable • Interpret ampacity chart for cable • Types of wring and other regulatory requirements • Load calculation • Factor influencing the selection of cable - Voltage - Current - Size of cable	➢ **Total** ➢ 25 Hrs ➢ **Theory** ➢ 5 Hrs ➢ **Practical** ➢ 20Hrs	• Cable ampacity • [cable& chart , thermal imager, temperature gun, • Megger, • clamp meter, • voltmeter	➢ ***Theo*ry** ➢ Class room ➢ ➢ **Practical** ➢ Lab ➢ Work shop

		- Length - Temperature			
	➢	• Types of cables with respect to insulations • Short circuit in cables • Environmental effect • Practical exercises related to work activity - Load calculation - Short circuits • selection of cable			

➢	➢ 4.2 Select safe route and layout for cabling ➢	• Interpret drawings & layouts • Type and size of cables • Mounting of cable • Describe the need of separate route for power and communication cables • Implement the relevant statutory regulations for laying cables • Identify and obtain safety hazards and other regularity requirements • Practical exercises related to work activity	➢	➢	➢

➢	➢ 4.3Joint cables according to load and surroundings ➢	• Use proper tools and equipments for jointing • Implements the safety regulation involved in joints and terminations • Types of joints - Simple joints - Twist joints - Married joints - T-joints - Retina joints • Applications of joints • Explain Different type of insulation and sheaths			➢

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➢	➢ 4.4Ensure the earthing of cable channels ➢	• Identify and obtain safety • hazards and other regularity requirements for earthings • Importance of earthing • Neutral phase fault • Earthing requirements • Purpose of earthing • Practical exercises related to work activity	➢	➢	➢
➢ **LU-5:** ➢ **Perform Lockout Tag out (LOTO**)	➢ 5.1 Follow instructions mentioned on work permit for LOTO	• Procedure for LOTO • Five security rule associated with LOTO - disconnect completely; - secure against re-connection; - verify that the installation is dead; - carry out earthing and short-circuiting; and - Provide protection against	• Electrical drawing • Work permit • locks, tags • signs • PPEs	➢	

		adjacent live parts. • Regularity requirements for LOTO		
	➢ 5.2 Select relevant circuit breaker to power off the worked area ➢	• Fault identifications techniques. • Disconnect the supply • Troubleshoot the system • Inspect electrical parameters • Change faulty parts • Practical exercises related to work activity		
	➢ 5.3 Use PPEs according to work requirement	• Maintain PPEs for specific job • Identify and obtain safety hazards and other regularity for work requirements • Practical exercises related to work activity		
	➢ 5.4 Display work permit at visible place	• Follow the company SOPs • Display work permit at appropriate place • Need Regularity requirements and specification for work permit		

➢ 5.5 Unlock LOTO and report to person concerned.	• Unlock procedures for LOTO • Importance for documents and reports
➢ 5.6 Dry run the machine after removal of LOTO	• Test run for machine after LOTO • Check electrical function and other requirement • obtain safety hazards and other regularity • Practical exercises related to work activity

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➢ **Module 2:**	➢ **Perform Electrical Preventive Maintenance Operations (EPM)**				
➢ **Objective of the Module:**	➢ On completion of this module the trainee will be able to demonstrate the following competencies according to industry standards and/or requirements: • Check machine condition through sensory • Perform Inspection with Tools & Equipment • Fill in Preventive maintenance Performa as per Requirement • Repair / Replace Faulty Parts of Equipment • Maintain record of spare parts for back up services ➢				
➢ **Duration:**	➢ **Total:** ➢ **275 hours**	➢ **Theory:**	➢ **75 hours**	➢ **Practice:**	➢ **200 hours**
➢ **Learning Unit**	➢ **Learning Outcomes** ➢	➢ **Learning Elements**	➢ **Duration (Hours)**	➢ **Materials Required**	➢ **Learning Place**
➢ **LU-1:**	➢ 1.1	• Definition of matter	➢ **To**	➢ **Non**	➢ **Theo**

➢ **Check machine condition through sensory** ➢	Demonstrate knowledge of electron theory ➢ ➢ ➢ ➢ ➢ ➢ ➢	• Different states of matter with examples • Definition of atom, molecule and element • Atomic structure and shells • Description of proton, electron and neutron • Definition of valence and free electrons • Properties of positive and negative charge • Definition of electricity • Properties of conductors, insulators and semiconductors • Laws of resistance • Relation between current (I), voltage (V) and resistance (R) • Ohms' Law • Circuit layout • Series • Parallel • Series/Parallel • Definition of AC and DC currents	**tal** ➢ 40 Hrs ➢ **Theory** ➢ 15 Hrs ➢ **Practical** ➢ 25 Hrs	**Consumable** • Oscilloscope • Digital clamp meter • Generator • Multi Meter ➢ **Consumable** • Analogue meter • Analogue voltmeter • Animation of atomic model • Animation of states of matter	**ry** ➢ Class room ➢ ➢ **Practical** ➢ Lab ➢ Work shop ➢
	➢ 1.2 Use following senses to	• Normal and abnormal behaviours of electrical equipments • Fault finding techniques		• Procedural instructions, equipment catalogues, inscribed	

	inspect the machine /equipment ➢ • Visual for gauges, motors direction ➢ • Hearing for vibration, noise ➢ • Touch for temperature, vibration ➢ • Smell for burning ➢	• Visual inspection • Technical inspection • Visual for gauges, motors direction • Hearing for vibration, noise • Sense temperature, vibration • Smell for burning • Practical exercises related to the behavioural inspections of machine		instruction documents, PPEs ➢	

	➢ 1.3 Document the area of improvement after inspection of machine /equipment/worked areas	• Importance of inspection • Inspection requirements • Specification • Importance of documents • Inspection reports and schedules • Kaizen theory			

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➢	➢ 1.4 Follow the safety and procedural instructions for preventive activities	• Safety requirements for Repair and Maintenance ➢ Specifications • Hazard identification	➢	➢	➢
➢ **LU-2:** ➢ **Perform Inspection with Tools & Equipment**	➢ 2.1 Select tools and equipment required for inspection of job ➢ ➢ ➢	• Types of tools, equipment and material for inspection • Select tools and equipment for inspection • Purpose of tools and equipments used in inspection	➢ **Total** ➢ 40Hrs ➢ **Theory** ➢ 15Hrs ➢ **Practical** ➢ 25Hrs	• Multimeter, • laser temperature gun, ampere meter • Megger meter, • vibro meter (stethoscope), tachometer, • earth resistance tester, PPEs,	➢ **Theory** ➢ Classroom ➢ ➢ **Practical** ➢ Lab ➢ Workshop

		- laser temperature gun - Temperature gauges - Tachometer - Vibero meter - CT and PTs - Stethoscope • Practical exercises related to selection of equipment		• overload relays, • CT and PTs	
	➢ 2.2 Evaluate previous preventive data for maintenance (machine data trouble card ➢	• Preventive maintenance -Tools - Equipment -Instruments - Machinery - Facilities • Maintaining electric tools • Define the following - Overloads relays - Current transformers	➢		➢

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➢	➢	- (CT) - Potential transformers (PT) - Magnetic connector • De energizing electrical equipment before inspection or repair • Purpose of protective equipment • Types of protective devices - Fuses - Relays - Circuit Breakers • Practical exercises related to inspection and function of Tools & Equipment	➢	➢	➢
	➢ 2.3 Carry out inspection with tools and equipment following vendor's preventive guidelines ➢ ➢	• Prepare maintenance plan or program for protective preventive guidelines. • Inspection schedules • Tools and equipment requirements • Inspections tools and equipment specifications			➢

		• Practical exercises related to routine inspection			
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➢	➢ 2.4 Follow safety instructions and procedural guidelines for preventive measures ➢	• Different safety signs and symbols • Precautions to prevent electrical hazards/shocks • Difference between insulated and conductive tools. • Different uses of insulated tools. • OHS precautions. • Hazards of using unsafe tools. • First aid treatment of electric shock. • Practical exercises related to workplace safety.	➢	➢	➢
➢ **LU-3:** ➢ **Fill in Preventive**	➢ 3.1 Conduct why-why analysis for identifying root cause	• identification of Electrical faults	➢ **Total**	• Preventive maintenance Performa, Multimeter,	➢ **Theory**

maintenance Performa as per Requirement	➢ ➢ ➢ ➢ ➢ ➢ ➢ ➢	• Fault findings techniques • Causes of faults • Common electrical faults - Short circuit fault - insulation fault - leakage current fault - earthing faults - neutral phase fault - phase to phase fault - phase to ground fault ➢ Practical exercises related to root cause analyses	➢ 80 Hrs ➢ **Theory** ➢ 20 Hrs ➢ **Practical** ➢ 60Hrs	• laser temperature gun, ampere meter, • megger meter, vibrometer (stethoscope), tachometer, earth resistance tester, PPEs	➢ Class room ➢ ➢ **Practical** ➢ Lab ➢ Work shop
	➢ 3.2Fill in the Performa for preventive maintenance according to provided format	• Importance of documents • Preventive maintenance organizational plan • Test reports • Shutdown schedules • Work permit for			

		➢ Preventive maintenance			
➢	➢ 3.3 Submit the performance for preventive maintenance to the concerned person for approval	• Procedure for operational documents • Final documentations • Handing over talking over procedure • Issuing policy and SOPs • Procedure for issuance of job documents • Practical exercises related to documents handling	➢	•	➢
➢ **LU-4:** ➢ **Repair / Replace Faulty Parts of Equipment**	➢ 4.1 Interpret machine data trouble card to get the machine/equipment troubleshooting/maintenance history	• Interpretation of drawings and circuit diagrams • Interpret the Standard and specification • Interpret units and symbols specifications • Interpret technical manuals ,service manuals and catalogs • Interpret Power circuit and control circuit diagrams	➢ **Total** ➢ 60 Hrs ➢ **Theory** ➢ 10 Hrs ➢ **Pr**	• screw drivers, • pliers set, • socket spanners, • Allen Key set, • ring spanners, • torque rod, • tong tester, • AVO meter,	➢ **Theory** ➢ Class room ➢ **Practical** ➢ Lab

➢	➢ 4.2 Communicate (verbal) the findings of machine data trouble card to the concerned person	• Importance and purpose of data trouble card • Understand technical problems • Interpret data trouble card • Report to seniors	**actical** ➢ 5 0Hrs	• service manuals, • parts catalog, • operation manual	➢ Work shop
	➢ 4.3Identify the faulty part/component of the equipment as per service manual ➢ ➢ ➢	• Fault findings techniques • Diagnose faults • Control circuit faults • Power circuit faults • Replace damage components • Minor and major faults • Practical exercises related to ➢ Maintenance faults			➢
➢					
➢	➢ 4.4 Fill in the corrective maintenance Performa to submit for approval ➢	• Importance of job documents • Corrective maintenance plans and organizational polices • Test reports • Shutdown schedules ➢ Work permit requirements for Corrective maintenance	➢	➢	➢
➢	➢ 4.5Repair or replace the faulty part(s) of job as per	• Replace and damages • Replace and repairing	➢	➢	➢

	service manual	techniques • Replacing and repairing procedures • Replace and repairing of electrical components. • Separate fluty parts • Techniques and procedure for tracing faults. • Practical exercises related to Repair or replace			
➢	➢ 4.6 Apply safety rules and regulations as per SOPs	• Safety requirements, specifications, Hazard identification • obtain safety and other regulatory requirements for Repair maintenance	➢	➢	➢
➢ **LU-5:** ➢ **Maintain record of spare parts for back up services**	➢ 5.1 Extract the information from machine data trouble card to maintain the inventory of parts ➢	• Importance of Inventory control system • Procedures for Availability of spear parts • Maintain inventory system • Practical exercises related to inventory	➢ **Total** ➢ 50 Hrs ➢ **Theory** ➢ 10 Hrs ➢ **Pr**	➢ Parts catalog, ➢ corrective maintenance card, ➢ machine data trouble card,	➢ **Theory** ➢ Class room ➢ ➢ **Practical** ➢ Lab

		control		➢ purchase requisition (PR), ICT	
	➢ 5.2 Communicate spare parts requirement to maintenance store for inventory maintenance ➢	• Inspect spare parts • Report to conform Availability • Inform the management for shortage of parts • Documentations for inventory			
	➢ 5.3 Check the quality of spare parts to identify original and fake products by using online and offline techniques	• Check quality inspection • Different type of spare parts • Selection parameters of spare parts Quality Specification Standard • Practical exercises related to quality check			

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➢ **Module 3:**	➢ **Perform Electrical Wiring**				
➢ **Objective of the Module:**	➢ On completion of this module the trainee will be able to demonstrate the following competencies according to industry standards and/or requirements: • Read / Interpret Drawing • Arrange Resources for electrical wiring • Perform Wiring (Domestic & Industrial), termination and tagging • Perform Wire Dressing • Perform Checking & Testing of electrical wiring				
➢ **Duration:**	➢ **Total:** ➢ **220 hours**	➢ **Theory:**	➢ **60 hours**	➢ **Practice:**	➢ **160 hours**
➢ **Learning Unit**	➢ **Learning Outcomes** ➢	➢ **Learning Elements**	➢ **Duration (Hours**	➢ **Materials Required**	➢ **Learning Place**

			)		
➢ **LU-1:** ➢ **Read / Interpret Drawing** ➢ ➢	➢ 1.1Differentiatebetween control and power wiring as per job requirement	• Definition of control circuit • Definition of power circuit • Types of electrical drawings - control circuit - power circuit - single line • Symbols used for different electrical points. • Select Appropriate Electric cables/wires and jointing material. • Practical exercises related to control and power wiring	➢ **Total** ➢ 45 Hrs ➢ **Theory** ➢ 15 Hrs ➢ **Practical** ➢ 30 Hrs	• Electrical drawing, , Computer drawings	➢ **Theory** ➢ Class room ➢ ➢ **Practical** ➢ Lab ➢ Work shop ➢

	➢ 1.2 Perform preliminary marking before termination of cables	• Marking techniques/method and points. • Types of measuring and marking tools and equipment • Perform measuring of PVC pipes and conduits • Practical exercises related to electrical terminations			
	➢ 1.3Follow drawing to perform wiring and for reporting/record purpose ➢	• Interpretation of drawings, symbols, cable number according to load, and colour coding • Identifying distribution points • Follow standards and IEEE regulation • Locate electrical points as per drawing • Practical exercises related to drawing and circuits to perform wiring			

➢ **LU-2:** ➢ **Arrange Resources for electrical wiring** ➢	➢ 2.1Enlist and arrange tools and material as per job ➢	• Purpose of tools, equipment and instruments • Use of electrical tools, equipment ,materials &instruments in wiring Types of breakers Fuses Relays Contactors Conductors Types cables Bass bars Earthing accessories Ducts DBs Controls panels Switch board Distribution board Light power plug • Standard accessories for domestic and industrial wiring • Practical exercises related to electrical wiring • Requisite tools and equipment	➢ **Total** ➢ 42 Hrs ➢ **Theory** ➢ 12 Hrs ➢ **Practical** ➢ 30 Hrs	• Emergency lights, • ladder, • drill machine tool ➢ kit and avometer	➢ **Theory** ➢ Class room ➢ ➢ **Practical** ➢ Lab ➢

	➢ 2.2 Arrange work permit for the wiring task	• Definition of KVA, KVAR and KW • Arrange tools and equipment for wiring • Work permit procedures	➢	➢	➢
	➢ 2.3 Arrange backup resources for lighting, power and safety purposes as per job requirement	• Types of back up resources Generator UPS Emergency lights • Use tools and equipment for backup system Change over Batteries Charge controllers Relays Timers Magnetic contactors • Safety requirements, specifications, Hazard identification for backup system • Practical exercises related to backup system	➢	➢	➢

➢ **LU-3:** ➢ **Perform Wiring (Domestic & Industrial), termination and tagging**	➢ 6.3Perform Wiring using following methods: • Concealed • Conduit • Busway • Open • Duct ➢ ➢ ➢ ➢	• Types of wirings • Open wiring • Underground wiring Concealed Conduit Bus way Open Duct • Use tools and equipment for open and underground wiring • Different Method of wirings • Follow electricity rules regulation for wiring and 1937 act • Define term Cable tray Trenching • Specification requirements regulation for domestic and industrial wiring	➢ **Total** ➢ 50Hrs ➢ **Theory** ➢ 10 Hrs ➢ **Practical** ➢ 40Hrs	• Thimble puncher, shroud, /covering • PVC tape, • HT tape, • thimbles, • cable knife, • wire stripper, • drill machine, • PPE	➢ **Theory** ➢ Classroom ➢ ➢ **Practical** ➢ Lab ➢

		• Practical exercises related to wiring and its types.			

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	3.2 Follow procedure to remove insulation and to attach thimbles	• Procedures for remove insulations • colour coding Techniques • Mark specific point as per drawings • Use insulation removing tools • Types of thimbles High voltage Low voltage • Follow Specification and standards for thimbles • Practical exercises related to electrical thimbles			
	3.3 Perform different types of terminations including • High tension (HT) • Low tension (LT) • Control shrouding • Sleeves	• Cable Termination Techniques High tension (HT) Low tension (LT) Control shrouding Sleeves • Types of terminations of cables Solder Type Crimp Type Insulation Displacement Direct Connection (Utility Block/ Screw Terminals) • Identify and obtain safety, hazards and other regulatory requirements for terminations			

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➢	➢ 3.4 Perform different types of joints ➢ • High tension ➢ • Low tension ➢ • Water proof/under ground ➢ • Open ➢ ➢	• Joint cables and connections for single phase and three phase • different types of cable joints Water proof/ underground Open • High tension Jointing methods - Tin (solder) - Eyelets and tunnel terminals - Cable shoes - Ferrules and shrinking nut - Bolt & screw terminal - Crimped lug • Low tension Jointing methods • Practical exercises related to HT and LT joints	➢	➢	➢

	➢ 3.5 Attach tags or numbers to wires for identification ➢	• Purpose of color coding ,tagging • Interpret standard and specification for tagging • Color coding standards and techniques for domestic and industrial wiring. • Identification methods for wiring cables for domestic and industrials use. • Tagging Method and Techniques			
➢	➢ 3.6 Use personal protective equipment as per job requirement	• Importance of PPEs • Purpose of personal protective equipment • Types of personal protective equipment Safety gloves Safety belt Goggles Helmet Safety shoes Leader Safety jackets • fire detection alarm circuit • Practical exercises related to PPEs and fire smoke detectors	➢	➢	➢

➢ **LU-4:** ➢ **Perform Wire Dressing**	➢ 4.1Maintain distance between power, communication and control wires according to job requirements.	• Identification of power and communication cables • Use of power cables • Rating standards and specifications of power cables • Distortion and noise • Difference between control and power cables • Difference between control and communication cables • Wire Dressing techniques and standards	➢ **Total** ➢ 43 Hrs ➢ **Theory** ➢ 13 Hrs ➢ **Practical** ➢ 30Hrs	• Cable tie, • clamps, • pliers, • cutter, • spiral/ flexible pipes, • tie base, • Rawl bolt, • Rawl plug, • Hilty bolt, • Wooden screw, • PPEs	➢ **Theory** ➢ Classroom ➢ ➢ **Practical** ➢ Lab ➢
	➢ 4.2Performalignment of cables as per job requirement	• Purpose of cable alignment • cable alignment techniques and procedures • Types and size of cables • Mounting of cables • Tools for cable works • Practical exercises related to cable mounting			

➢ **LU-5:** ➢ **Perform Checking & Testing of electrical wiring**	➢ 5.1Check continuity using line of terminal	• Importance of testing • Procedures for continuity test • Use tools and equipment for continuity test • purpose of continuity test • check terminations of cables • Practical exercises related to continuity test	➢ **Total** ➢ 40 Hrs ➢ **Theory** ➢ 10 Hrs ➢ **Practical** ➢ 30Hrs	• AVO meter, • test lamp, • earth tester, • line tester, • PPE, • Megger	➢ **Theory** ➢ Classroom ➢ ➢ **Practical** ➢ Lab ➢
	➢ 5.2 Perform test to identify open/close circuits	• Definition of Circuits, Open circuit Close circuit • Properties of open and close circuit • Procedure of Open circuit test • Procedure of Close circuit test • Requirements for open circuit and close circuit test • Practical exercises related to open and close circuits test			
	➢ 5.3 Perform live test for verification of wiring ➢	• Identification of live parts • Hazards with live parts • Test for live parts • Practical exercises related to live test for wiring			

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➢	➢ 5.4 Verify proper grounding / Panel Earthing (PE) on designated locations ➢ ➢	• Importance of Earthing. • Purpose of earthings • Types of earthing materials and earthing components. • Techniques and procedure for digging for earthing • Techniques and procedure of connecting Earthing system with main distribution box. • Practical exercises related to Earthing.	➢	➢	➢

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➢ **Module 4:**	➢ **Install Electrical System**				
➢ **Objective of the Module:**	➢ On completion of this module the trainee will be able to demonstrate the following competencies according to industry standards and/or requirements: • Read / Interpret Electrical Layout • Arrange Resources (e.g. Power Supply, Tools & Equipment) for electrical equipment installation/dismantling • Perform Electrical Panel Installation • Perform Cable Installation • Perform Cable Dismantling • Perform Electrical Appliances Installation • Perform Electrical equipment Dismantling • Perform Earthing • Provide Power Supply to machine				
➢ **Duration:**	➢ **Total:** ➢ **360 hours**		➢ **Theory:** ➢ **80 hours**	➢ **Practice:** ➢ **280 hours**	
➢ **Learning Unit**	➢ **Learning Outcomes** ➢	➢ **Learning Elements**	➢ **Duration (H**	➢ **Materials Required**	➢ **Learning Place**

			ours)		
➢ **LU-1:** ➢ **Read / Interpret Electrical Layout** ➢ ➢	1.1 Interpret layout of the job for installations	• Interpret standard and specification for installations. • Scales, standards and techniques for domestic and industrial installation layout. • Review and interpret installation plans and circuit diagram. • Practical exercises related to installations layout. ➢	➢ **Total** ➢ 30 Hrs ➢ **Theory** ➢ 5Hrs ➢ **Practical** ➢ 25 Hrs	• Drawings, • operations manuals • callipers • hack saw • measuring tap • screw driver sets	➢ **Theory** ➢ Class room ➢ ➢ **Practical** ➢ Lab ➢ Work shop ➢
	➢ 1.2 Read/interpret electrical drawing for electrical wirings	• Drawings and symbols ➢ Specifications • Interpret electrical wirings telecom, civil drawings and scales. • Identify types and quantity of materials as per drawing. • Interpret Control circuits, power circuits, lift circuits and automatic circuits. • Locate electric points and tags according to electrical drawing.			
	➢ 1.3 Follow drawing	• Types of connection scheme • Use tools and equipment for connections			

	to connect components of equipment	• Techniques and procedure of connecting electrical components as per drawing • Practical exercises related to connection			
➢ **LU-2:** ➢ **Arrange Resources (e.g. Power Supply, Tools & Equipment) for electrical equipment installation/dismantling**	➢ 2.1Develop a list of required resources as per layout	• Work permit requirements • Types of tools, equipment and material • Types of drawings ➢ (civil, electrical and communication) • Identify types and quantity of materials as per drawing. • Work related Practical exercise	➢ **Total** ➢ 40 Hrs ➢ **Theory** ➢ 5 Hrs ➢ **Practical** ➢ 30 Hrs	• Layouts, • ICT, • measuring tools • callipers • cable chart • hand hacksaw measuring tape, • laser gun for length quality standards, vendor certificate, grinding cutter, • drill machines, • hammer	➢ **Theory** ➢ Class room ➢ ➢ **Practical** ➢ Lab ➢
	➢ 2.2 Prepare purchase requisition according to job specification (quality, quantity) ➢	• Identify job specifications - Quality - Quantity • Prepare Requisite form • Purchase and sell requirements			

	➢ 2.3 Inspect items specifications against the purchase requisition ➢	• Importance of inspection • Check delivery form • Inspect purchased equipments According to job specification - Types of equipments - Quality - Quantity - Ratings - specifications • Physical inspections • Technical inspection • Price check • Warranty claim forum • Work related Practical exercise			
➢ **LU-3:** ➢ **Perform Electrical Panel Installation** ➢	➢ 3.1 Demonstrate electrical panel installations procedures	• Interpret diagram symbols and lay out schemes • Interpret wiring standards codes, and scales for installations • Identify types of installation layouts • Record information techniques from layouts • Practical exercises related to panel installations	➢ **Total** ➢ 45Hrs ➢ **Theory** ➢	• Layouts, • lifters, • chain-pulley • jacks, • sprit level	➢ **Theory** ➢ Classroom ➢ **Practical** ➢ Lab ➢

	➢ 3.2 Extract information from layout regarding panel installations	• Arrange tools &equipment • Measure lay out points • Mark lay out points • Identify points • Importance of correct position and location	15 Hrs ➢ **Practical** ➢ 40 Hrs		
	➢ 3.3 Connect input and output of cables in relevant panels as per electrical layouts ➢	• Selection of cables • Input /output voltages • Connections techniques • Types of connection - Direct connection - By-pass connections • Identification of cables - Power cables - Control cable • Load calculation techniques			

➢ **LU-4:** ➢ **Perform Cable Installation**	➢ 4.1Interpret layouts for cable route	• Interpretation of drawings, layouts and circuits. • Interpret electrical symbols, codes and color coding used in wiring diagrams and circuits layouts. • Understand work permit requirements • Interpret cable route and schemes for installations	➢ **Total** ➢ 80Hrs ➢ **Theory** ➢ 20 Hrs ➢ **Practical** ➢ 60 Hrs	• Layouts, measuring tools • cutting tools • wire cutter • side cutter • cable cutter • thimble presser • Megger • stacker • tags • glands • shrouds • conduits • cable tray etc.	➢ **Theory** ➢ Classroom ➢ **Practical** ➢ Lab
	➢ 4.2 Handle cable for laying with the help of stacker	• Cable laying procedures • Procedures for pulling-in cables ➢ Tools for pulling-in cables • Cable Handling techniques • Types and purpose of stacker • Laying techniques by using steel wire • Practical exercises related tocable laying techniques			
	➢ 4.3 Tag both ends of cables for cable tracing ➢	• Identification of faulty cables • Purpose of Tag on faulty parts • Safety requirements, specifications, Hazards for Tagging • Tagging procedures • cable tracing techniques			

	➢ 4.4 Lay cables in cable trays according to route plan ➢	• Follow work permit requirements • Tools and equipment for Cables Laying • Cables Laying procedures • Lay cables according to route plan			
➢	➢ 4.5 Perform testing of cables e.g. insulation, continuity ➢	• Importance of cable testing • Purpose of cable testing • Testing tools &equipments • Testing procedure and other regulatory requirements • Types of wiring test - Insulation test - Continuity test - Short circuit test - Earth test - On load test - Off load test • Practical exercises related to operational testing	➢		➢

➢ **LU-5:** ➢ **Perform Cable Dismantling**	➢ 5.1Interpret layouts for cable route	• Interpretation of drawings, layouts and circuits. • Interpret electrical symbols, codes and colour coding used in wiring diagrams and circuits layouts. • Understand work permit requirements • Interpret cable route and schemes for installations • Practical exercises related to layouts and routs.	➢ **Total** ➢ 40Hrs ➢ **Theory** ➢ 10 Hrs ➢ **Practical** ➢ 30Hrs	• Layouts, • Cutting tools e.g. • wire cutter • side cutter • cable cutter • stacker • tags etc.	➢ **Theory** ➢ Classroom ➢ ➢ **Practical** ➢ Lab ➢
	➢ 5.2 Disconnect electric supply from the job	• Identification of worn out or damaged parts • Analyse faults • Use PPEs • Protective equipment			➢

		- Fuse - Circuit breaker - Relay - Change over • Reason for short circuit - Low quality cable - Increases load - Temperature increases - Un-awareness • Disconnect electric supply ➢ procedures			
➢	➢ 5.3 Handle cable for laying with the help of stacker ➢	• Follow work permit requirements • Tools and equipment for Cables Laying	➢	➢	➢

		• Cables Laying procedures • Lay cables according to route plan • Practical exercises related to cables laying			
	➢ 5.4 Tag both ends of cables for cable tracing	• Identification of faulty cables • Purpose of Tag on faulty parts • Safety requirements, specifications, Hazards for Tagging • Tagging procedures ➢ cable tracing techniques			
➢	➢ 5.5 Remove cables in cable trays according to route plan	• Follow work permit requirements and SOPs • Tools and equipment for Cables removing • Remove cables according to route	➢	➢	➢

		plan • Related Practical exercises			

➢ **LU-6:** ➢ **Perform Electrical Appliances Installation**	➢ 6.1Interpret vendor's user manual for electrical installations	• Safety requirements for installation - Specifications - Hazard identification • Interpret vendor's user manual and technical guides • Interpret symbols and diagrams • Follow user manuals and steps for installations	➢ **Total** ➢ 30Hrs ➢ **Theory** ➢ 5 Hrs ➢ **Practical** ➢ 25 Hrs	• Drawing • Layout • manual • fork lifter • drill machine • PPE	➢ **Theory** ➢ Classroom ➢ **Practical** ➢ Lab
	➢ 6.2 Coordinate with concerned departments before installations for feedback	• Safety requirements for assembling - Specifications - Hazard identification • importance of communication with relevant persons • Coordinate with concerned authority • Practical exercises related to installations			

➢	➢ 6.3 Connect cables with machines as per operation manual ➢	• Safety requirements for connection • Connection techniques • Follow operation manual for connection • Procedures for machine connections • Motor connection - Star connection - Delta connection - Direct connections - Washing machine connection - Drier connection - Microwave oven - Iron - Tube light - Float switch - Energy meter - Distribution box - Earthing connections - Juicer machine - Blinder connection - Toaster - UPS connection - AC connection	➢	•	➢

		- Air cooler connections			
	➢ 6.4 Verify the connections with respect to color coding/tagging/numbering ➢ ➢	• Interpret wiring diagrams, symbols and color coding • Types of connection • Use tools and equipment for connection • Verify connection according to diagrams, code			
➢					
➢ **LU-7:** ➢ Perform Electrical equipment Dismantling	➢ 7.1Extract information from layouts regarding electrical equipment dismantling	• Dismantling procedures • Interpret electrical/civil layouts • Identification of worn out or damaged parts • Rules and regulations for electrical equipment dismantling • Practical exercises related to equipment Dismantling	➢ **Total** ➢ 35Hrs ➢ **Theory** ➢ 10 Hrs ➢ **Practical**	• Layouts, • lifters, • chain-pulley • jacks • tags	➢ **Theory** ➢ Classroom ➢ ➢ **Practical** ➢ Lab ➢
	➢ 7.2 Disconnect input/output cables of relevant equipment	• Input out voltage specifications • Disconnections techniques for electrical supply • Safety measurements for disconnection of cables			

		• Causes for disconnection of cables	➢ 25 Hrs		
	➢ 7.3 Remove equipment from location as per SOPs ➢	• Removing and replacing procedures • Identification of worn out or damaged parts • Importance of correct position and location as per SOPs • Techniques and procedure for tracing faults			
➢					
➢	➢ 7.4Handle removed equipment as per manufacturers' instructions ➢	• Safety requirements for removed equipment - Specifications - Hazard identification • Procedures remove to equipments as per manufacturers' instructions	➢	➢	➢
➢	➢ 7.5 Place tags on dismantled items as per SOPs	• Procedures for log out/tag out and labelling on dismantled item • Techniques to Identify dismantle parts	➢	➢	➢
➢	➢ 7.6 Store the dismantled equipment at ➢	• Knowledge about Waste disposal and dismantle procedures • Storage requirements for dismantle	➢	➢	➢

		equipment • Importance of proper and designated places for equipments			
➢					
➢ **LU-8:** ➢ **Perform Earthing**	➢ 8.1 Perform earthing of cables according to calculated load ➢	• Calculation of load requirements • Importance of earthing • Purpose of earthing • Use tools and equipment for earthing • Types of earthing materials and earthing components. • Practical exercises related to earthing	➢ **Total** ➢ 30Hrs ➢ **Theory** ➢ 5 Hrs ➢ **Practical** ➢ 25 Hrs	• Soldering • Earth tester • Thimble presser • PPE	➢ **Theory** ➢ Classroom ➢ ➢ **Practical** ➢ Lab ➢
	➢ 8.2 Perform earthing of electrical appliances according to calculated load	➢ • Identify and obtain safety, hazards and other regulatory requirements • Types of Earthing system • Techniques and procedure for digging and installation of earthing system. • Procedure of connecting Earthing cables with main distribution box.			

	➢ 8.3 Perform earth resistance test as per standards ➢	• Earth tester • Procedure for calculating Earth resistance • Earthing standards, rules and other regulatory requirements			
➢ **LU-9:** ➢ **Provide Power Supply to machine**	➢ 9.1 Interpret electrical drawings for power supply distribution	• Interpret electrical drawings, symbols and layout. • Interpret distribution schedules of power supply • Interpret load shading schedules • Practical exercises related to power distribution drawings	➢ **Total** ➢ 25Hrs ➢ **Theory** ➢ 5Hrs ➢ **Practical** ➢ 20 Hrs	• Drawings, • multi meters, • PPE ➢	➢ **Theory** ➢ Classroom ➢ ➢ **Practical** ➢ Lab ➢
	➢ 9.2 Perform power distribution according to drawings	• Identify and obtain safety, hazards and other regulatory requirements for power supply distribution • Follow distribution schedules • Identify distribution supply as per drawing			
	➢ 9.3 Perform verification of electrical supply as per operations manual ➢	• Electrical Supply system - DC system - AC system • Types of AC supply - Single Phase - 3 phase			

		• UPS /generators back up supply • Practical exercises related to ➢ electrical supply			

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- ➢

➢ **Module5:**	➢ **Perform Troubleshooting**				
➢ **Objective of the Module:**	➢ On completion of this module the trainee will be able to demonstrate the following competencies according to industry standards and/or requirements: • Obtain Problem Specific Documents (Instructional Manual, Work Order) • Perform Fault Diagnosis of the job/machine/equipment (electrical, mechanical, instrumental				
➢ **Duration:**	➢ **Total: 145 hours**	➢ **Theory: 45 hours**		➢ **Practice: 100 hours**	
➢ **Learning Unit**	➢ **Learning Outcomes** ➢	➢ **Learning Elements**	➢ **Duration (Hours)**	➢ **Materials Required**	➢ **Learning Place**
➢ **LU-1:** ➢ **Obtain Problem Specific Documents (Instructional**	➢ 1.1 Demonstrate work order assessment as per	• Plan and prepare for work • Work order requirements • Techniques for prioritize the multiple jobs • Follow work order Technical manual, instructional guides and other regulatory	➢ **Total** ➢ 40 Hrs ➢ **Theory**	➢ • Work order, • machine manuals • electrical drawing • operator fault	➢ **Theory** ➢ Class room ➢ ➢ **Pract**

Manual, Work Order) ➢ ➢	priority ➢ 1.2 Collect relevant documents for troubleshooting ➢ ➢ ➢ ➢ ➢ ➢	requirements for work • Importance of documentation • Interpret machine manual and drawings • Prepare troubleshooting reports and other inspection documents • Check electrical parameters	➢ 15 Hrs ➢ **Practical** ➢ 25 Hrs	register ➢ ➢	**ical** ➢ Lab ➢ Work shop ➢
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➢	➢ 1.3 Describe the purpose of machine data trouble card from operations ➢	• Collect data trouble card for troubleshooting • Collect Work permits required for troubleshooting Check history card warranty cards for troubleshooting • Report to operation department for machine troubleshooting • Describe basic	➢	➢	➢

		functions of machines • Perform Practical exercises related to ➢ machine data trouble card			

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➢ **LU-2** ➢ **Perform Fault Diagnosis of the job/machine/ equipment (electrical, mechanical, instrumental**	➢ 2.1 Demonstrate work related documents and purpose of machine data trouble card ➢	• Describe Basics of Machine operations • Collect information from data trouble card for troubleshooting • Complete work related documents ➢	➢ **Total** ➢ 105 Hrs ➢ **Theory** ➢ 30 Hrs ➢ **Practical** ➢ 75 Hrs	• Machine fault register • standard tool kit, • AVO meter • star set, tester • Instructional Manual (OEM), electrical tool kit • PPE	➢ **Theory** ➢ Class room ➢ ➢ **Practical** ➢ Lab ➢ ➢
	➢ 2.2 Follow Original Equipment Manufacturer (OEM) Service Manual of machine/equipment for troubleshooting	• Describe the basic functions of - Gauges, - valves, - belt, - Bearing - VFDs - PLCs, - relays, - Control circuits , - Motors control etc. • Follow Original Equipment Manufacturer (OEM) Service Manuals			

		• Perform Practical exercises related to Equipment troubleshooting according to Manufacturer (OEM) Service Manual			
	➢ 2.3 Inspect the equipment from inside and outside using visual aids and standard	• Perform Damage identification regarding - cracks - shape and structure broken parts • Identify faults • Perform Visual inspection • Perform Technical inspection • Apply Fault finding techniques • Perform Practical exercises related to equipment inspections	➢		➢

2.4 Observe behaviour of component/part of equipment at testing terminals of electrical equipment ➢	• Observe behaviour of Following component used in different machines • Capacitors behaviour • Inductors behaviour • Energizing and de-energizing effect • Temperature effect • Low voltage high voltage effect • Voltage drop effect • Low quality effect • Perform Testing of electrical equipment • Check electrical parameters • Perform Practical exercises related to behaviour of component			

	2.5 Apply safety measures	• Describe Safety requirements, • Describe specifications, • Describe Hazard identification • Describe safety measures - personal safety - equipment safety • Perform Practical exercises related to safety measures			

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➢ **Module 6:**	➢ **Repair Electrical Equipment**				
➢ **Objective of the Module:**	➢ On completion of this module the trainee will be able to demonstrate the following competencies according to industry standards and/or requirements: • Repair / Replace faulty Components/parts of electrical equipment/machine/job • Prepare Work Completion Report				
➢ **Duration:**	➢ **Total:** ➢ **165 hours**	➢ **Theory:**	➢ **45 hours**	➢ **Practice:**	➢ **120 hours**
➢ **Learning Unit**	➢ **Learning Outcomes** ➢	➢ **Learning Elements**	➢ **Duration (Hours)**	➢ **Materials Required**	➢ **Learning Place**
➢ **LU-1:** ➢ **Repair / Replace faulty Components/parts of**	➢ 1.1 Identify different types	• Describe Types of tools used for identification of faults • Describe Techniques to identify faults Bypassing Direct input jumpers	➢ **Total** ➢ 10 5Hrs ➢ **Th**	• Work permit, • Tool kit, • LOTO, • PPEs ,	➢ **Theory** ➢ Class room ➢

electrical equipment / machine/job ➢	of electrical faults ➢ ➢ ➢ ➢ ➢ ➢ ➢ ➢ ➢ ➢ ➢ ➢	Secondary injector • Analyse system fault. • Prepare Report of faults • Describe Repair Distribution box panels Star delta starter Reverse forward DOL starters ATS panels • Describe Repair of motors Single phase Three phase • Describe Basic Motor faults regarding Winding insulation fault Bearing problem Coupling fault Rotor stator vibration fault • Perform Practical exercises related to faults in electrical components	**eory** ➢ 25 Hrs ➢ **Practical** ➢ 80 Hrs	• Safety manuals, • Megger, • AVO meter, • Regulated power supply (AC and DC), • Clamp meter • Spare parts of defective components ➢ ➢	➢ **Practical** ➢ Lab ➢ Work shop ➢
	➢ 1.2 Follow the work permit requirements for repairing/repla	• Identify and obtain safety, hazards and other regulatory requirements for conduct repairing • Obtain Work permit required • Describe Replacing procedures			

	cing faulty parts				
	➢ 1.3 Explain the procedure for Repair / replace the defective component ➢	• Identify worn out or damaged parts • Perform Visual inspection • Perform Technical inspection • Replace defective components as per required • Perform Practical exercises related to repair /replace faulty components ➢			
	➢ 1.4 Comply safety measures to avoid any damage to the equipment ➢ ➢ ➢	• Describe Routine inspection • Describe Procedures for measuring input and output parameters • Analyse Electrical system ➢ Load balancing ➢ Scheduled maintenance • Use of appliances • Perform Practical exercises related to safety measures to avoid damage to the equipment			

	➢ 1.5 Demonstrate the procedures for test run/ dry-run of equipment's	• Describe dry-run procedures • Test operation and specifications of equipment and appliances. • Measure and check standards, specifications ➢ And technical parameters. • Perform Practical exercises related to repair /replace faulty components ➢ ➢			
➢ **LU-2:** ➢ **Prepare Work Completion Report**	➢ 2.1 State electrical terminology and measure technical parameters	• Define of KVA, KVAR and KW • Perform Calculation of angle • Describe Power triangle • Describe Advantages and Disadvantages of low power factor • Describe Techniques to improve power factor • Perform Measurements	➢ **Total** ➢ 60Hrs ➢ **Theory** ➢ 20 Hrs ➢ **Practical** ➢ 40Hrs	• Report register • PC • Current meter • Voltage meter • Frequency meter • Power factor meter • Watt meter • Lux meter • Earth Tester ➢	➢ **Theory** ➢ Classroom ➢ ➢ **Practical** ➢ Lab ➢

		of electrical parameters Current Voltage Frequency Power factor ISE VOC VL Earth resistance Magnetic flux Power in KW, KVAR & KVA • Describe Procedures for measuring input and output voltages • Analyze voltage drops • Load balancing • Review distribution priority plan • Describe Job compliance • Describe			

		Operation / Functionality			
	➢ 2.2 Explain the types and procedures of report writing ➢	- Prepare work completion reports as per following - - Time of reporting - Observation of operation staff - Observation of shift staff - Specification of machine - Type of fault, - fault history - maintenance and troublesh			

		ooting reports - root cause - Details of action plan - Specification of faulty equipment - Dry run report - Remarks of operation staff - Perform work related practical exercises ➢			

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➢ **Module 7:**	➢ **Develop Professionalism**				
➢ **Objective of the Module:**	➢ On completion of this module the trainee will be able to demonstrate the following competencies according to industry standards and/or requirements: • Plan the task based on the work permit • Evaluate quality of work • Communicate with others in Urdu and English in appropriate terms • Upgrade professional skills and knowledge				
➢ **Duration:**	➢ **Total:** ➢ **60 hours**	➢ **Theory:**	➢ **60 hours**	➢ **Practice:**	➢ **0 hours**
➢ **Learning Unit**	➢ **Learning Outcomes** ➢	➢ **Learning Elements**	➢ **Duration (Hours)**	➢ **Materials Required**	➢ **Learning Place**

➢ **LU-1:** ➢ **Plan the task based on the work permit**	➢ 1.1 Coordinate with other involved departments ➢	• Personal protective equipment • Tools and equipment • Hazards of using unsafe tools.	➢ **Total** ➢ 15 Hrs ➢ ➢ **Theory** ➢ 15 Hrs ➢ ➢ **Practical** ➢ 0 Hrs	• Work permit. Tools. PPEs ➢	➢ **Theory** ➢ Class room ➢ ➢ **Practical** ➢ Lab ➢ Work shop ➢ Local industry
	➢ 1.2 Organize PPEs	• Personal protective equipment • Tools and equipment • Hazards of using unsafe tools. • Importance of safe working environment.			
	➢ 1.3 Identify required tools, accessories and material in terms of type and quantity.	• Tools and equipment and calibration thereof • Protective Materials • Types quantity • fire detection alarm circuit • smoke detectors			

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➢ **Learning Unit**	➢ **Learning Outcomes** ➢	➢ **Learning Elements**	➢ **D**	➢ **Materials Required**	➢ **Learning Place**
➢ **LU-2:** ➢ **Evaluate quality of work**	2.1 Ensure safety measures are taken care of. ➢	• Importance of safe working environment • Initiate maximum safety steps to ensure safety at work place	➢ **Total** ➢ 15 Hrs ➢ ➢ **Theory** ➢ 15 Hrs ➢ ➢ **Practical** ➢	➢	➢ **Theory** ➢ Class room ➢ ➢ **Practical** ➢ Lab ➢
	2.2 Select appropriate method and techniques for assessing the quality of work.	• Work requirements • Importance of quality check • Quality inspection techniques • Method of quality check			
	2.3 Check functions and achievement of parameters. ➢	• Importance of function check , dimension, safety and workplace tidiness • Importance of trends and market research to work role • Check technical parameters			

	2.4 Perform housekeeping according to organization's procedures.	• Keep workplace well organised • Ensure clean working environment • Housekeeping procedures • Procedures of measurement and testing	0		

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➢ Learning Unit	➢ Learning Outcomes	➢ Learning Elements	➢ D	➢ Materials Required	➢ Learning Place
➢ **LU-3:** ➢ **Communicate with others in Urdu and English in appropriate terms** ➢	➢ 3.1 Use positive and clear communication with stake-holders	• Importance of communication • Read, write and speak Urdu and English • 7Cs of communication • Effective communication within and outside the organisation • Clients and Vendors communication strategy ➢	➢ **T** ➢ 1 ➢ ➢ **T** ➢ 1 ➢ ➢ **P** ➢ 0	➢	➢
	3.2 Develop effective working relationship with others	• Coordinate well in the work environment • Use of electronic and relevant media when required • Effective relationship within and outside the organisation •			

➢ 3.3 Convey information professionally and technically within team and with other departments.	• Update knowledge and skill • Importance of being a good team player • Effective relationship within and outside the organisation • Career guidance and counselling

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➢ **Learning Unit**	➢ **Learning Outcomes**	➢ **Learning Elements**	➢ **D**	➢ **Materials Required**	➢ **Learning Place**
➢ **LU-4:** ➢ **Upgrade professional skills and knowledge**	➢ 4.1 Utilize available documentation to update knowledge. ➢	• Report and portfolio writing • Document training outcome ➢ Interpret technical manuals and guides	➢ **T** ➢ 1 ➢	➢	➢
	➢ 4.2 Seek help and direction from supervisors / technically skilled one.	• Planning of your career • Training with skilled one. • Up-grade skills through workshop	➢ **T** ➢ 1 ➢		
	➢ 4.3 Analyse information and choose best solution.	• Manage workload as per task • Task priorities • Check work regularly to ensure accuracy • Distribution of work among co-workers	➢ **P** ➢ 0		
	➢ 4.4 Attend training programs and workshops	• Participate in training • Outcomes and relevance of training • Development of skill sets over time by way of			

		seminars, workshops and competitions.			
	➢ 4.5 Research information using computer/internet.	• Identify and use self-study sources • Research methods • Access to sources			

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➢ **Module8:**	➢ **Computer Skills**				
➢ **Objective of the Module:**	➢ On completion of this module the trainee will be able to demonstrate the following competencies according to industry standards and/or requirements: • Introduction to Computer • MS-Word • MS-Excel • PowerPoint ➢				
➢ **Duration:**	➢ **Total:** ➢ **110 hours**	➢ **Theory:**	➢ **50 hours**	➢ **Practice:**	➢ **60 hours**
➢ **Learning Unit**	➢ **Learning Outcomes** ➢	➢ **Learning Elements**	➢ **Duration (H**	➢ **Materials Required**	➢ **Learning Place**

			ours)		
➢ **LU-1:** ➢ **Introduction to** ➢ **Computer** ➢	➢ 1.1 After completion of this unit the student will be able to understand about Computer Hardware and software	• Computer (Definition) • Information Processing Cycle • Components of the Computer • Data Representation • Software • Hard ware	➢ **Total** ➢ 25 Hrs ➢ **Theory** ➢ 15 Hrs ➢ **Practical** ➢ 10 Hrs	• Desktop • Computer • MS-0ffice 2010 • Handout for students • Multimedia	➢ **Theory** ➢ Class room ➢ ➢ **Practical** ➢ Lab ➢ Work shop ➢
➢ **LU-2:** ➢ **MS-Word** ➢ **(Basic to intermediate)**	➢ 2.1After completion of this unite the student will be able to use the word processing	• Introduction • Editing and Formatting Text • Formatting Paragraph • Printing Documents • Formatting Pages • Checking Spelling and Grammar • Generating Report	➢ **Total** ➢ 35 Hrs ➢ **Theory** ➢ 10 Hrs	• Desktop • Computer • MS-0ffice 2010 • Handout for students • Multimedia	➢ **Theory** ➢ Class room ➢ ➢ **Practical** ➢ Lab

	application (MS-Word) of MS-Office		➢ **Practical** ➢ 20 Hrs		➢ Work shop
➢ **Learning Unit**	➢ **Learning Outcomes** ➢	➢ **Learning Elements**	➢ **Duration (Hours)**	➢ **Materials Required**	➢ **Learning Place**
➢ **LU-3:** ➢ **MS-Excel** ➢ **(Basic to intermediate)** ➢	➢ 3.1After completion of this unit the student will be able to use the spread sheet application(MS-Excel)of	• Introduction • Typing Data • Basic Formatting • Modifying Worksheets • Working with Formulas • Working with Basic Functions • AutoFilter • Charts • Printing Work books	➢ **Total** ➢ 35 Hrs ➢ **Theory** ➢ 10 Hrs ➢ **Practical**	• Desktop • Computer • MS-0ffice 2010 • Handout for students • Multimedia	➢ **Theory** ➢ Class room ➢ ➢ **Practical** ➢ Lab ➢ Work shop

	MS-Office		➢ 20 Hrs		➢
➢ **LU4:** ➢ **MS-PowerPoint** ➢ **(Basic to intermediate)** ➢	➢ 4.1 After completion of this unit the student will be able to use the Power Point application(MS-PowerPoint)of MS-Office	• Introduction • Creating and Saving Presentations • Proofing Your Content • Working with Pictures and • Multimedia • Running Slide Show	➢ **Total** ➢ 35 Hrs ➢ **Theory** ➢ 15 Hrs ➢ **Practical** ➢ 10 Hrs	• Desktop • Computer • MS-0ffice 2010 • Handout for students • Multimedia	➢ **Theory** ➢ Class room ➢ ➢ **Practical** ➢ Lab ➢ Work shop ➢

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➢ **Module 9:**	➢ **English Language Skills I**			
➢ **Objective of the Module:**	➢ On completion of this module the trainee will be able to demonstrate the following competencies according to industry standards and/or requirements: • Introduction to Listening Part I-Listening to Match Information • Introduction to Listening Part II-Listening to Respond • Introduction to Listening Part III – Following Conversations • Introduction to Listening Part IV – Listening for Key Information • Introduction to Reading Part I - Reading to Understand the Sequence of a Text • Introduction to Reading Part II –Understanding the Text Structures • Introduction to Reading Part III - Understanding the Purpose of Text • Introduction to Reading Part IV – Reading for Key Information ➢			
➢ **Duration:**	➢ **Total:** ➢ **60 hours**	➢ **Theory:** ➢ **60 hours**	➢ **Practice:** ➢ **0 hours**	
➢ **Learning Unit**	➢ **Learning Outcomes** ➢	➢ **Learning Elements**	➢ **Materials Required**	➢ **Learning Place**
➢ **LU-1:** ➢ **Introduction to Listening Part I-**	➢ 1.1 Able to listen and match informatio	• Listening to Match Information • Parts of Body • Daily routine	• Hand-out • Audio CD ➢	➢ **Theory** ➢ Class room

Listening to Match Information ➢	n and practice Effective and active listening. ➢ ➢	• How do I spend my day? • People and profession • Riddles • All over the world • My visits • Colours all around	➢	➢

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➢ Learning Unit	➢ Learning Outcomes	➢ Learning Elements	➢ Du	➢ Materials Required	➢ Learning Place
➢ **LU-2:** ➢ **Introduction to Listening Part II- Listening to Respond** ➢	➢ 2.1 Achieve an elementary level of listening skills to Respond accordingly. ➢	• Listening to Respond • Introduction and meeting • A day at school • At a hotel • My stay • Inquiry • Uncle Fester • At a railway station	➢ **Total** ➢ 10Hrs ➢ **Theory** ➢ 10Hrs ➢ **Practical** ➢ 0 Hrs	• Hand-out • Audio CD	➢ **Theory** ➢ Class room ➢
➢ **LU-3:** ➢ **Introduction to** ➢ **Listening Part III – Following Conversations**	➢ 3.1 Improve English language listening comprehension skills to participate more effectively in Communicative skills to Follow conversations. ➢	• Following Conversations • At a restaurant • Birthday invitation • Birthday party • At the garment store • At a party • At a bank • Movie • UFO	➢ **Total** ➢ 10Hrs ➢ **Theory** ➢ 10Hrs ➢ **Practical** ➢ 0 Hrs	• Hand-out • Audio CD	➢ **Theory** ➢ Class room ➢

➢ **LU 4.** ➢ **Introduction to** ➢ **Listening Part IV – Listening for Key Information** ➢	➢ 4.1 Expand English language listening comprehension skills to focus on particular key information.	• Listening for Key Information • Being busy • Hello, may I help you? • First impressions • Making conclusions • Robbery • A trip to London • Job opportunity • A advice	➢ **Total** ➢ 5 Hrs ➢ **Theory** ➢ 5 Hrs ➢ **Practical** ➢ 0 Hrs	• Hand-out • Audio CD	➢ **Theory** ➢ Class room

➢ Learning Unit	➢ Learning Outcomes	➢ Learning Elements	➢ Du	➢ Materials Required	➢ Learning Place
➢ **LU 5:** ➢ **Introduction to Reading Part I - Reading to Understand the Sequence of a Text**	➢ 5.1 Achieve an acceptable level of reading skills and follow meaning sequences as well.	• Reading to Understand the • Sequence of a Text • ABC • Words in my life • My puzzled world of words • Senseless! • Let's give sentences a sense • Let's make a story • Read and to be a writer • Reading comprehension	➢ **Total** ➢ 5 Hrs ➢ **Theory** ➢ 5 Hrs ➢ **Practical** ➢ 0 Hrs	• Hand-out • Audio CD	➢ **Theory** ➢ Class room
➢ **LU6.** ➢ **Introduction to Reading Part II -Understanding** ➢ **the Text Structures**	➢ 6.1 Acquire an adequate level of reading skills and be able to understand different Types of reading structures.	• Understanding the Text Structures • Turn on the meaning • Be a reading detective • Making a decision on opinions • Read a picture • Read a map • Reading between the lines • Build a reading bridge • Read and answer	➢ **Total** ➢ 10Hrs ➢ **Theory** ➢ 10Hrs ➢ **Practical** ➢ 0 Hrs	• Hand-out • Audio CD	➢ **Theory** ➢ Class room

➢ **LU7.** ➢ **Introduction to Reading Part III - Understanding the Purpose of Text**	➢ 7.1 Enable students confident to read independently to look for the key information. ➢	• Finding essence • Facts and opinions • What is the purpose? • Give me a title • Recognizing patterns • Vocabulary • Skimming • Scanning Dictionaries	➢ **Total** ➢ 5 Hrs ➢ **Theory** ➢ 5 Hrs ➢ **Practical** ➢ 0 Hrs	• Hand-out • Audio CD	➢ **Theory** ➢ Class room ➢
➢ **Learning Unit**	➢ **Learning Outcomes** ➢	➢ **Learning Elements**	➢ **Du**	➢ **Materials Required**	➢ **Learning Place**
➢ **LU8.** ➢ **Introduction to** ➢ **Reading Part** ➢ **IV - Reading** ➢ **for Key** ➢ **Information**	➢ 8.1 Enable students confident to read independently to look for the key information.	• Reading for Key Information • PMI • Summarizing • KWL • Learning log • Visualizing • Crossword • Taking notes • Reading – silent and aloud	➢ **Total** ➢ 10Hrs ➢ **Theory** ➢ 10Hrs ➢ **Practical** ➢ 0	• Hand-out • Audio CD ➢	➢ **Theory** ➢ Class room ➢

			Hrs		

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➢ **Module 10:**	➢ **English Language Skills II**				
➢ **Objective of the Module:**	➢ On completion of this module the trainee will be able to demonstrate the following competencies according to industry standards and/or requirements: • Introduction to Writing Part I- Completing a form • Introduction to Writing Part II – Correcting errors • Introduction to Writing Part III –Communicating ideas and information • Introduction to Writing Part IV - Writing a text • Introduction to Speaking Part I - Introduction to language • Introduction to Speaking Part II – Social Situations • Introduction to Speaking Part III –Exchanging information and opinion • Introduction to Speaking Part IV - Presenting a topic ➢				
➢ **Duration:**	➢ **Total:** ➢ **45 hours**	➢ **Theory:** ➢ **45 hours**		➢ **Practice:** ➢ **0 hours**	
➢ **Learning Unit**	➢ **Learning Outcomes** ➢	➢ **Learning Elements**	➢ **Duration (Hours)**	➢ **Materials Required**	➢ **Learning Place**
➢ **LU-1:** ➢ **Introduction to Writing Part I-**	➢ 1.1 Improve students' basic	• Completing a form • All about you • What do I look like?	➢ **Total** ➢ 6Hrs ➢ **Theo**	• Hand-out • Audio CD ➢	➢ **Theory** ➢ Class room

➢ **Completing a form** ➢	English Language writing skills	• Where am I from? • Likes and dislikes • What about you?	**ry** ➢ 6 Hrs ➢ **Practical** ➢ 0 Hrs		➢

➢ Learning Unit	➢ Learning Outcomes	➢ Learning Elements	➢ Du	➢ Materials Required	➢ Learning Place
➢ **LU-2:** ➢ **Introduction** ➢ **to Writing Part II – Correcting errors**	➢ 2.1 Improve students' English language writing skills focusing on basic writing errors. ➢	• Correcting errors • Capital Letters • Full stops • Other Punctuations We all make Mistakes	➢ **Total** ➢ 6 Hrs ➢ **Theory** ➢ 6 Hrs ➢ **Practical** ➢ 0 Hrs	• Hand-out • Audio CD ➢	➢ **Theory** ➢ Class room ➢
➢ **LU-3:** ➢ **Introduction** ➢ **to Writing Part III -** ➢ **Communicating** ➢ **ideas and information** ➢	➢ 3.1 Improve students' English language writing skills concerning their immediate surroundings	• Communicating ideas and information • Where do you live? • My family • What's his job? • What can you do?	➢ **Total** ➢ 6 Hrs ➢ **Theory** ➢ 6 Hrs ➢ **Practical** ➢ 0 Hrs	• Hand-out • Audio CD ➢	➢ **Theory** ➢ Class room ➢

➢ **LU4.** ➢ **Introduction to Writing Part** ➢ **IV - Writing a** ➢ **text** ➢	➢ 4.1 Improve students' English language formal and informal writing skills	• Writing a text • Writing informally in response to a text • Replying to a letter • Suggestions in a letter • Having a great time • Café life • Writing a formal response • Making suggestions • Expressing ideas • Explaining why?	➢ **Total** ➢ 6 Hrs ➢ **Theory** ➢ 6 Hrs ➢ **Practical** ➢ 0 Hrs	• Hand-out • Audio CD ➢	➢ **Theory** ➢ Class room ➢

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➢ Learning Unit	➢ Learning Outcomes	➢ Learning Elements	➢ Du	➢ Materials Required	➢ Learning Place
➢ **LU5.** ➢ **Introduction** ➢ **to Speaking** ➢ **Part I -** ➢ **Introduction to** ➢ **language** ➢	➢ 5.1 Improve students' English language speaking skills by discussing basic and general Information. ➢	• Introduction to language • Sounds interesting • Patterns and shapes • Numbers and dates • Family • Hobbies and interests • Home and hometown • Occupations • Languages • Weather	➢ **Total** ➢ 6 Hrs ➢ **Theory** ➢ 6 Hrs ➢ **Practical** ➢ 0 Hrs	• Hand-out • Audio CD ➢	➢ **Theory** ➢ Class room ➢
➢ **LU6.** ➢ **Introduction** ➢ **to Speaking** ➢ **Part II -** ➢ **Social Situations** ➢	➢ 6.1 Improve students' English language speaking skills by sharing information on higher level.	• Social situations • Greeting, exclaiming and saying • goodbye • Asking and answering questions • Describing people, things, and places • Expressing likes, dislikes and • preferences • Complaining	➢ **Total** ➢ 6 Hrs ➢ **Theory** ➢ 6 Hrs ➢ **Practical** ➢ 0 Hrs	• Hand-out • Audio CD ➢	➢ **Theory** ➢ Class room ➢

		• Apologising and forgiving • Accepting and refusing offers • Suggesting and proposing • Responding to invitations • Advising • If I were you…			

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➢ **Learning Unit**	➢ **Learning Outcomes**	➢ **Learning Elements**	➢ **Duration (Hours)**	➢ **Materials Required**	➢ **Learning Place**
➢ **LU7.** ➢ **Introduction** ➢ **to Speaking** ➢ **Part III -** ➢ **Exchanging** ➢ **information and** ➢ **opinion** ➢	➢ 7.1 Improve students' English language speaking skills by sharing information on higher level. ➢	• Exchanging information and opinion • Same and different people and things • Same and different actions • What's in your picture? • Plans, maps and routes • Asking for and giving directions • Diaries and arrangements • Making plans • Were your school days the happiest	➢ **Total** ➢ 5 Hrs ➢ **Theory** ➢ 5 Hrs ➢ **Practical** ➢ 0 Hrs	• Hand-out • Audio CD ➢	➢ **Theory** ➢ Class room ➢

		• Days of your life? • How do you commute to work? • Are you in a rut? • How to report people? • How do you spend your leisure time? • I have done it! • Is tourism appreciated?			
➢ **LU8.** ➢ **Introduction to Speaking** ➢ **Part IV -** ➢ **Presenting a topic** ➢	➢ 8.1 Improve students' English language speaking skills by expressing and presenting opinions and experiences.	• Presenting a topic • People • Personalities • Clothes • Books, music and film • Places • Food and drink • How was your dinner? • Machines and technology • Sports and games • Travelling • Where would you stay? • Reading – silent and aloud	➢ **Total** ➢ 4 Hrs ➢ **Theory** ➢ 4 Hrs ➢ **Practical** ➢ 0 Hrs	• Hand-out • Audio CD ➢	➢ **Theory** ➢ Class room ➢

➢ **Module 11:**	➢ **Life Skills I**			
➢ **Objective of the Module:**	➢ On completion of this module the trainee will be able to demonstrate the following competencies according to industry standards and/or requirements: • Exploring and Understanding Self • Effective Communication • Personal Grooming			
➢ **Duration:**	➢ **Total:** ➢ **30 hours**	➢ **Theory:**	➢ **30 hours** ➢ **Practice:**	➢ **00 hours**
➢ **Learning Unit**	➢ **Learning Outcomes** ➢	➢ **Learning Elements**	➢ **Materials Required**	➢ **Learning Place**
➢ **LU-1:** ➢ **Exploring and Understanding Self** ➢ ➢ ➢ ➢ ➢ ➢	1.1 Understand the importance and acquire skills for self-awareness and emotional intelligence for a solid foundation in personal effectiveness ➢ ➢ ➢	➢ Describe the following • Self-Awareness • Self-Discovery • Self-Knowing • Self Esteem • Self-Concept • Emotions Management • Know emotions • Explore intense emotions • Deal with own emotions	• Multimedia • White Board • Markers • Speakers • www.ehow.com • Internet • ILO Life Skills Manual	➢ **Theory** ➢ Classroom ➢ ➢ ➢ ➢ ➢

		• Deal with others emotions • Lead via emotional intelligence		
➢ **LU-2:** ➢ **Effective Communication** ➢	➢ 2.1 Understand the importance of communication in life and learn about different elements of effective communication ➢	➢ Understand • Communication styles Listening skills • Presentation Skills • Body Language • Voice • Managing Information Presentation skills	• Multimedia • White Board • Markers • Speakers • www.ehow.com • Internet • ILO Life Skills Manual	➢ **Theory** ➢ Classroom
➢ **LU-3:** ➢ **Personal Grooming** ➢ ➢ ➢	➢ 3.1 Learn various factors which makes a well-groomed person who is also socially effective	➢ Learn • Etiquettes and Self presentation regarding • Dressing • Dealing with others • Manage hygiene	• Multimedia • White Board • Markers • Speakers • www.ehow.com • Internet • ILO Life Skills Manual	➢ **Theory** ➢ Classroom ➢

➢

➢ **Module 12:**	➢ **Life Skills II**				
➢ **Objective of the Module:**	➢ On completion of this module the trainee will be able to demonstrate the following competencies according to industry standards and/or requirements: • Working with Teams • Vision and Goal Setting • Professional Development • Personal and Social Responsibility				
➢ **Duration:**	➢ **Total: 30 hours**	➢ **Theory: 30 hours**		➢ **Practice: 0 hours**	
➢ **Learning Unit**	➢ **Learning Outcomes** ➢	➢ **Learning Elements**	➢ **Duration (Hours)**	➢ **Materials Required**	➢ **Learning Place**
➢ **LU-1:** ➢ **Working**	➢ 1.1 Comprehend how to	➢ Understand the following • Team building	➢ **Total** ➢ 10	• Multimedia • White Board	➢ **Theory** ➢ Class

➢ **with Teams** ➢	work with people / groups ➢ ➢ ➢ ➢ ➢ ➢ ➢	• Knowing diversity • Team building Techniques • Team work • Manage diversity	Hrs ➢ **Theory** ➢ 10 Hrs ➢ **Practical** ➢ 0 Hrs	• Markers • Speakers • Internet • TLR • ILO Life • Skills Manual	room ➢ ➢ Work shop ➢

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➢

➢ **Learning Unit**	➢ **Learning Outcomes** ➢	➢ **Learning Elements**	➢ **Duration (Hours)**	➢ **Materials Required**	➢ **Learning Place**
➢ **LU-2:** ➢ **Vision and** ➢ **Goal Setting**	➢ 2.1 Develop personal vision and goals for fulfilling one's dreams for a successful life ➢	➢ Develop • Personal Vision and Goal Setting • Develop Personal Development plan	➢ **Total** ➢ 5 Hrs ➢ **Theory** ➢ 5 Hrs ➢ **Practical** ➢ 0 Hrs	• Multimedia • White Board • Markers • Speakers • Internet • TLR • ILO Life Skills Manual ➢	➢ **Theory** ➢ Class room ➢ **Practical** ➢ Work shop

➢ **LU-3:** ➢ **Professional** ➢ **Development** ➢ ➢ ➢ ➢ ➢ ➢	➢ 3.1 Know how to make an effective CV and learn Interviewing techniques for better chances of getting a job	• Know Twenty First Century workplace • Know Job Searching Techniques • Know Effective Use of Social Media • Know CV Writing and giving Interviews • Know Continuous Professional Development ➢	➢ **Total** ➢ 10 Hrs ➢ **Theory** ➢ 10 Hrs ➢ **Practical** ➢ 0 Hrs	• Multimedia • White Board • Markers • Speakers • Internet • TLR • ILO Life Skills Manual	➢ **Theory** ➢ Class room ➢ **practical** ➢ Work shop

➢

➢ **Learning Unit**	➢ **Learning Outcomes**	• **Learning Elements**	➢ **Duration (Hours)**	➢ **Materials Required**	➢ **Learning Place**
➢ **LU-4:** ➢ **Personal and Social** ➢ **Responsibility** ➢	➢ 4.1 Understanding & responding impact of gender disparity and gender in culture on individuals / groups	➢ Understand the following • Gender Sensitivity • Difference between sex & gender • Division of labour • Power & decision ➢ making • Practical gender need ➢ Rights & ➢ Responsibilities • • Sexual Harassment at Workplace ➢	➢ **Total** ➢ 5 Hrs ➢ **Theory** ➢ 5 Hrs ➢ **Practical** ➢ 0 Hrs	• Multimedia • White Board • Markers • Speakers • Internet • TLR • ILO Life Skills Manual	➢ **Theory** ➢ Class room ➢ **practical** ➢ Work shop

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- **Module 13 Title: On-the-Job Training - I**

- **Objective of the Module:** Gain real work place understanding, skills and experience.

Duration	**Theory**	**Practical**
800 Hrs	0 hrs	800 Hrs

Month	**Week**	**Recommended rotation plan**	**Applied**
1	1	**Company Orientation (Department wise)**	Awareness of chain of command on the plant site,
	2	HSE Procedures and regulations of local authority and the	Health, Safety and Environment manuals and policies; Equipment
	3	Types of Materials used and their selection	Importance and use of warehouse; Supply and
	4	**Monthly report writing**	MS- Office or computerized logging or reporting system
2	5	**Personnel protective equipment**	Use and importance of PPE; Maintain the best and safe
	6	Health, Safety and Environment overview of work place as well as equipment	Safety at Work, Understanding Emergency procedures, Fire Fighting, Waste
	7		product management, Identifying hazards, define
	8	**Monthly report Writing**	MS- Office or computerized escaping route, material logging or reporting system

3-4	9 10 11 12 13 14	**Perform Electrical Preventive Maintenance Operations (EPM)**	Maintenance and repair work of plant machinery and provide assistance to existing maintenance team as well as operation personnel, learn and use the line tracing and Equipment system. Plant documentation and control section its importance and methods of record keeping. Security and authentication of control and as-built documentation Inspect the machine/equipment by using senses, control of different equipment, motors direction, motor control, vibration control, temperature sensors, noise sensors, star delta circuits.
			Visually verify wire gauge, Single phase and three phase motor preventive maintenance, generator service, Current transformers (CT) and Potential transformer (PT) uses, measure electrical parameters.
			Transformer connection, motor generator connections protection circuits, relays, CBs and insulators, diagnose basic electrical faults.
	15 16	**Monthly report Writing**	MS- Office or computerized logging or reporting system
5-6	17 18		Interpret wiring circuits ,wiring lay outs ,interpret single line and power circuit diagrams, marking of wiring points , locate points, , Load calculation, selection of cable estimate wiring plan, single phase wiring ,three phase wiring, laying of cable trenching, termination of cables
	19 20 21 22 23	**Perform Electrical Wiring**	Domestic wiring ,industrial wiring, control wiring, types of wiring (concealed wiring ,open wiring conduit ducts wiring) , prepare wiring plan , bus way ,Bus bar connections ,, inspect quality of cable, Star delta panel wiring, DOL panel wiring ,ATS panel wiring ,reverse forward circuit wiring, power circuit wiring, HT, LT wirings techniques.
	24	**Monthly report Writing**	MS- Office or computerized logging or reporting system

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- **Module 14 Title: On-the-Job Training –II**

➢ **Objective of the Module:** Gain real work place understanding, skills and experience.

➢ **Duration**	➢ **Theory**	➢ **Practical**
➢ 800 Hrs	➢ 0 hrs	➢ 800 Hrs

➢ **Month**	➢ **Week**	➢ **Recommended rotation plan**	➢ **Applied**
➢ ➢ ➢ ➢ ➢ ➢ **1**	➢ 1 ➢ 2 ➢	➢ **Review of OJT-I (Department wise)** • Procedures and regulations of local and the company • Materials use and their selection •	• Awareness of chain of command on the plant site, process unit wise orientation and • Understanding ➢ Health, Safety and Environment manuals and policies; Equipment specifications, study of company's safe working procedures ➢ • Importance and use of warehouse; Supply and demand concept, international codes and standards of materials

➢ **2-3**	➢ 3 4	➢ **Health, Safety and Environment** ➢ **overview of work place as well as** ➢ **equipment** ➢ ➢ Monthly report writing	➢ Safety at Workplace, Understanding Emergency procedures, Fire Fighting, waste product management, Identifying hazards, define escaping (exit) route, material Identification, ➢ Surface Protection Methods (ensure safety at workplace) ➢ ➢ MS- Office or computerized logging or reporting system
	➢ 5	➢ ➢ ➢ **Install Electrical System**	➢ Use and importance of PPE as per Installations requirements ; Maintain the best and safe working practices for installations ; Healthy and ➢ Incident free work place, implementation of accident reporting culture, installation requirements of electrical motor, Generators, Transformers, wiring installations, domestic and industrial ,star delta starter installation DOL starter
	➢ 6		
	➢ 7 ➢		
	➢ 8		
	➢ 9		
	➢ 10		
	➢ 11		
	➢ 12	➢ **Monthly report Writing**	➢ MS- Office or computerized

➢ 4-5	➢ 13	➢ **Perform Troubleshooting**	➢ Keep deep observation through perfect knowledge of process and procedure on the plant. Actively participate in the solution of problem or fault findings; Manage and handle the Emergency and provide assistance on the pant. Inspect and troubleshoot the machine/equipment, troubleshoot electrical faults and control different equipment, troubleshoot motors directions, motor control, vibration control, temperature, noise sensors, star delta circuits. Troubleshoot wirings faults domestic and industrials. Troubleshoot Power circuit, control circuit. Troubleshoot
	➢ 14		
	➢ 15		
	➢ 16		
	➢ 17		
	➢ 18		
	➢ 19		
	➢ 18		
	➢ 20	➢ **Monthly report Writing**	➢ MS- Office or
	➢ 21	➢ **Repair Electrical Equipment**	➢ Trouble shoot Transformer connection, motor ➢ Troubleshoot earthing ➢ Repair motors Single phase, Three phase, repair
	➢ 22		➢ Repair Domestic wiring (concealed wiring ,open wiring conduit ducts wiring) ,industrial wiring, control wiring, ,bus way ,Bus bar
	➢ 23		
	➢ 24	➢ **Monthly report Writing**	➢ MS- Office or

4. Assessment guidance

Competency-based assessment is the process of gathering evidence to confirm the candidate's ability to perform according to specified outcomes articulated in the competency standard(s).

4.1 Types of assessment

a) Sessional assessment

- The goal of sessional assessment is to monitor student progress in order to provide constant feedback. This feedback can be used by the trainers to improve their teaching and by learners to improve their learning.
- More specifically, sessional assessments Help learners to identify their strengths and weaknesses and Help trainers to recognize where learners are struggling and address problems immediately
- Examples of sessional assessments include:
- Observations
- Presentations
- Activity sheets
- Project work
- Oral questions
-
- b) Summative (final) assessment
- The goal of summative (final) assessment is to evaluate learning progress at the end of a training program by comparing it against, e.g. set of competency standards.
- Examples of summative assessments include:
- Direct observation of work activities
- Final project
- Written questions

- **4.2 Principles of assessment**
- When conducting assessment or developing assessment tools, trainers/assessors need to ensure that the following principles of assessment are met:
- **Validity**
- Indicates if the assessment outcome is supported by evidence. The assessment outcome is valid if the assessment methods and materials reflect the critical aspects of evidence required by the competency standards (Competency units, performance criteria, knowledge and understanding).
- **Reliability**
- Indicates the level of consistency and accuracy of the assessment outcomes. The assessment is reliable if the assessment outcome will produce the same result for learners with equal competence at different times or places, regardless of the trainer or assessor conducting the assessment.
- **Flexibility**
- Indicates the opportunity for learners to discuss certain aspects of their assessment with their trainer or assessor, such as scheduling the assessment. All learners should be made aware of the purpose of assessment, the assessment criteria, the methods and tools used, and the context and proposed timing of the assessment well in advance. This can be achieved by drawing up a plan for assessment.
- **Fair assessment**
- Fair assessment does not advantage or disadvantage particular learners because of status, race, beliefs, culture and/or gender. This also means that assessment methods may need to be adjusted for learners with disabilities or cultural differences. An assessment should not place unnecessary demands on learners that may prevent them from demonstrating competence.
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➢ **4.3 Assessment template – Sessional and Summative assessment**

➢ **Module Title**	➢ **Learning Units**	➢ **Recommended form of assessment**	
		➢ **Sessional**	➢ **Summative**
➢ **Module 1:** ➢ Maintain Safety ➢	1. Apply personal safety measures 2. Apply workplace safety measures 3. Follow Work Permit 4. Maintain Safety of Wiring & Cables 5. Perform Lockout Tag out (LOTO)	• Activity sheets • Simulation • Oral and written questions	➢ Integrated assessment: • Project • Demonstration • Role play • Oral and written questions
➢ **Module 2:** • Perform Electrical Preventive Maintenance Operations (EPM)	1. Check machine condition through sensory 2. Perform Inspection with Tools & Equipment 3. Fill in Preventive maintenance Performa as per Requirement 4. Repair / Replace Faulty Parts of Equipment 5. Maintain record of spare parts for back up services	• Observation • Simulation • Oral and written questions • Demonstration	
➢ **Module 3:** ➢ Perform Electrical Wiring ➢	1. Read / Interpret Drawing Arrange Resources for electrical wiring 2. Perform Wiring (Domestic & Industrial), termination and tagging 3. Perform Wire Dressing 4. Perform Checking & Testing of electrical wiring	• Observation • Oral and written questions • Demonstration	

➢ **Module 4:** ➢ Install Electrical System	1. Read / Interpret Electrical Layout 2. Arrange Resources (e.g. Power Supply, Tools & Equipment) for electrical equipment installation/dismantling 3. Perform Electrical Panel Installation 4. Perform Cable Installation 5. Perform Cable Installation 6. Perform Electrical Appliances Installation 7. Perform Electrical equipment Dismantling 8. Perform Earthing 9. Provide Power Supply to machine	➢ ➢ • • Observation • Simulation • Oral and written questions • Demonstration	
➢ **Module 5:** ➢ Perform Troubleshooting	1. Obtain Problem Specific Documents (Instructional Manual, Work Order) 2. Perform Fault Diagnosis of the job/machine/equipment (electrical, mechanical, instrumental) Perform post soldering inspection	• Activity sheets • Simulation • Oral and written questions • Demonstration	➢
➢ **Module 6:** ➢ Repair Electrical Equipment ➢	1. Repair / Replace faulty Components/parts of electrical equipment/machine/job 2. Prepare Work Completion Report	• Activity sheets • Simulation • Oral and written questions • Demonstration	
➢ **Module 7:** ➢ Develop Professionalism	1. Plan the task based on the work permit 2. Evaluate quality of work 3. Communicate with others in Urdu and English in appropriate terms 4. Upgrade professional skills and knowledge	• Activity sheets • Simulation • Oral and written questions	

		• Demonstration	
➢ **Module 8:** ➢ Computer Skills ➢	1. Introduction to Computer 2. MS-Word (Basic to Intermediate) 3. MS-Excel (Basic to Intermediate) 4. MS-PowerPoint (Basic to Intermediate)	• Activity sheets • Simulation • Oral and written questions • Demonstration	➢
➢ **Module 9:** ➢ English Language Skills I	1. Introduction to Listening Part I -Listening to Match Information 2. Introduction to Listening Part II -Listening to Respond 3. Introduction to Listening Part III -Following Conversations 4. Introduction to Listening Part IV -Listening for Key Information 5. Introduction to Reading Part I -Reading to Understand the Sequence of a Text 6. Introduction to Reading Part II -Understanding the Text Structures 7. Introduction to Reading Part III -Understanding the Purpose of Text 8. Introduction to Reading Part IV -Reading for Key information	• Observation • Oral and written questions • Demonstration	
➢ **Module 10:** ➢ English Language Skills II	1. Introduction to Writing Part I -Completing a form 2. Introduction to Writing Part II -Correcting errors 3. Introduction to Writing Part III -Communicating ideas and information 4. Introduction to Writing Part IV -Writing a text	• Activity sheets • Simulation • Oral and written questions	

	5. Introduction to Speaking Part I -Introduction to language 6. Introduction to Speaking Part II -Social situations 7. Introduction to Speaking Part III exchanging information and opinion 8. Introduction to Speaking Part IV -Presenting a topic	• Demonstration ➢	
➢ **Module 11:** ➢ Life Skills I	1. Exploring and Understanding Self 2. Effective Communication 3. Personal Grooming	• Observation • Oral and written questions • Demonstration	
➢ **Module 12:** ➢ Life Skills II ➢	4. Working with Teams 5. Vision and Goal Setting 6. Profession al Development 7. Personal and Social Responsibility	• Observation • Oral and written questions • Demonstration	➢
➢ **Module 13:** ➢ OJT-I	➢	• Observation • Oral and written questions • Demonstration	
➢ **Module 14:** ➢ OJT-II	➢	• Observation • Oral and written questions • Demonstration	

➢ **5. List of Tools, Machinery & Equipment**

➢ **Occupational**	➢ **Electrical Technician – Level 2**

title		
➢ **Duration**	➢ **2years**	
➢ **Sr. No.**	➢ **Name of Item/ Equipment / Tools**	➢ **Quantity**
1.	➢ Adjustable wrench	➢ **AS PER INDUSTERY CODE OF PRACTAISE**
2.	➢ Amp meter	➢
3.	➢ AVO meter	➢
4.	➢ Batteries	➢
5.	➢ Battery charger	➢
6.	➢ Bench vice	➢
7.	➢ hole cutter	➢
8.	➢ Charge controller	➢
9.	➢ Chisel	➢
10.	➢ Clamp- on meter	➢
11.	➢ Compass	➢
12.	➢ Side Cutter	➢
13.	➢ Drill machine	➢
14.	➢ Earth tester meter	➢

15.	➢ Extension board	➢
16.	➢ File set	➢
17.	➢ Gloves	➢
18.	➢ Goggles	➢
19.	➢ Grinder	➢
20.	➢ Hammer	➢
21.	➢ Hand drill machine	➢
22.	➢ Helmet	➢
23.	➢ Hertz meter (frequency meter)	➢
24.	➢ Hacksaw	➢
25.	➢ Knife (cable)	➢
26.	➢ Spirit Level	➢
27.	➢ L-key set	➢
28.	➢ Lock pliers	➢
29.	➢ Measuring tape	➢
30.	➢ Megger (Analogue& Digital)	➢
31.	➢ Micrometer	➢
32.	➢ Multimeter	➢
33.	➢ Number punch	➢
34.	➢ Phase sequence meter	➢
35.	➢ Pipe cutter	➢
36.	➢ Pipe vice	➢
37.	➢ Pipe wrench	➢

38.	➢ Pliers set	➢
39.	➢ Punching tool (Networking /Telephone)	➢
40.	➢ Ratchet set	➢
41.	➢ Safety boots	➢
42.	➢ Scissor	➢
43.	➢ Screw driver set	➢
44.	➢ Soldering iron	➢
45.	➢ Spanner set	➢
46.	➢ Steel scale	➢
47.	➢ Steel wire	➢
48.	➢ Synchronizing meter	➢
49.	➢ Tachometer	➢
50.	➢ Tester	➢
51.	➢ Thimble press	➢
52.	➢ Torch	➢
53.	➢ Vernier calliper	➢
54.	➢ Volt meter	➢
55.	➢ Wire gauge	➢
56.	➢ Wood saw	➢

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- **6. List of Consumable Supplies**

Occupational title	**Electrical Technician**		
Duration	**2years**		
Sr. No.	**Name of Item/ Equipment / Tools**	**Range**	**Quantity**
1.	PVC Flexible wire	40/0.076 blue	200m
2.	PVC Flexible wire	40/0.076 yellow	200m
3.	PVC flexible Two core twist wire cable	40/0.076	100m
4.	Single way switch (Piano type)	5Amp	24
5.	Two way switch (Piano type)	5Amp	24
6.	Two pole main switch	10 Amp	24
7.	Two pin socket (Piano type)	5 Amp	24
8.	Lamp holder	Piano Type	24
9.	Lamp holder	Pendant Type	24

10.	➢ Cable 3/0.029	➢	➢ 2 Roll
11.	➢ Cable 7/0.029	➢	➢ 1 Roll
12.	➢ Bulb	➢ 100W	➢ 24
13.	➢ Bulb	➢ 200W	➢ 24
14.	➢ PVC pipe	➢ "1/2x10Ft	➢ 6
15.	➢ Junction Box (1/2 inch)	➢ (1,2, 3, 4 ways)	➢ 24
16.	➢ Ceiling Rose	➢	➢ 24
17.	➢ Machine Screw	➢ 1/8” x 1”, 3/16” x 2”	➢ 2 pack
18.	➢ Wooden Screw	➢ "1,"3/4, 1x1/2," 2	➢ 2 pack
19.	➢ Plug show	➢ 10Amp	➢ 12
20.	➢ Florescent Tube	➢ 40W	➢ 6
21.	➢ Tube starter	➢ 220V	➢ 12
22.	➢ Timer for washing machine	➢ 220V	➢ 6
23.	➢ Selector switch	➢ 220V	➢ 6
24.	➢ Indicator	➢ 220V	➢ 12
25.	➢ Insulation Tap	➢ -	➢ 24
26.	➢ Fan Capacitor	➢ (3.5uf)	➢ 6

27.	➢ Motor Capacitor	➢ (80/110uf)	➢ 6
28.	➢ Connecter	➢ (5, 10, 15A)	➢ 12
29.	➢ Heater Element	➢ 750W	➢ 12
30.	➢ Fibber washers	➢ -	➢
31.	➢ Cut Screw difference size	➢ 1/2, 3/4, 1", 1.5"	➢ 4 pack
32.	➢ Soldering Wire	➢ 60/40	➢ 6
33.	➢ soldering flux	➢ Local	➢ 6 pack
34.	➢ LED	➢	➢ 120
35.	➢ Diode	➢	➢ 120
36.	➢ Carbon Resistor	➢	➢ 150
37.	➢ Power Resistor 5 Watt	➢	➢ 30
38.	➢ Capacitors	➢	➢
39.	➢ Transistor	➢ NPN, PNP	➢ 60
40.	➢ Photo Diode	➢	➢ 15
41.	➢ Florescent Tube holder set	➢	➢ 10 each
42.	➢ Hydro meter	➢	➢ 4
43.	➢ compass	➢	➢ 5
44.	➢ Energy saver	➢ 24 W	➢ 12
45.	➢ Distilled water	➢	➢ As per

			requirements
46.	➢ Sulphuric acid H2so4	➢	➢ As per requirements
47.	➢ Batteries	➢ Different Size	➢ As per requirements
48.	➢ DC cables	➢ Different current rating	➢ 1 coils each
49.	➢ Ravole bolt	➢ Different Size	➢ As per requirements
50.	➢ DC motors	➢ 30 watt /50 watt	➢ As per requirements
51.	➢ DC lights	➢ Different Size	➢ As per requirements
52.	➢ DC fans	➢ Different Size	➢ As per requirements
53.	➢ Fuse	➢ Different types	➢ As per requirements
54.	➢ Butterfly bolts and nuts	➢ Different Size	➢ As per requirements
55.	➢ Expansion bolts	➢ Different Size	➢ As per requirements
56.	➢ Hack saw blade	➢ 12” double edge	➢ 1 dozen