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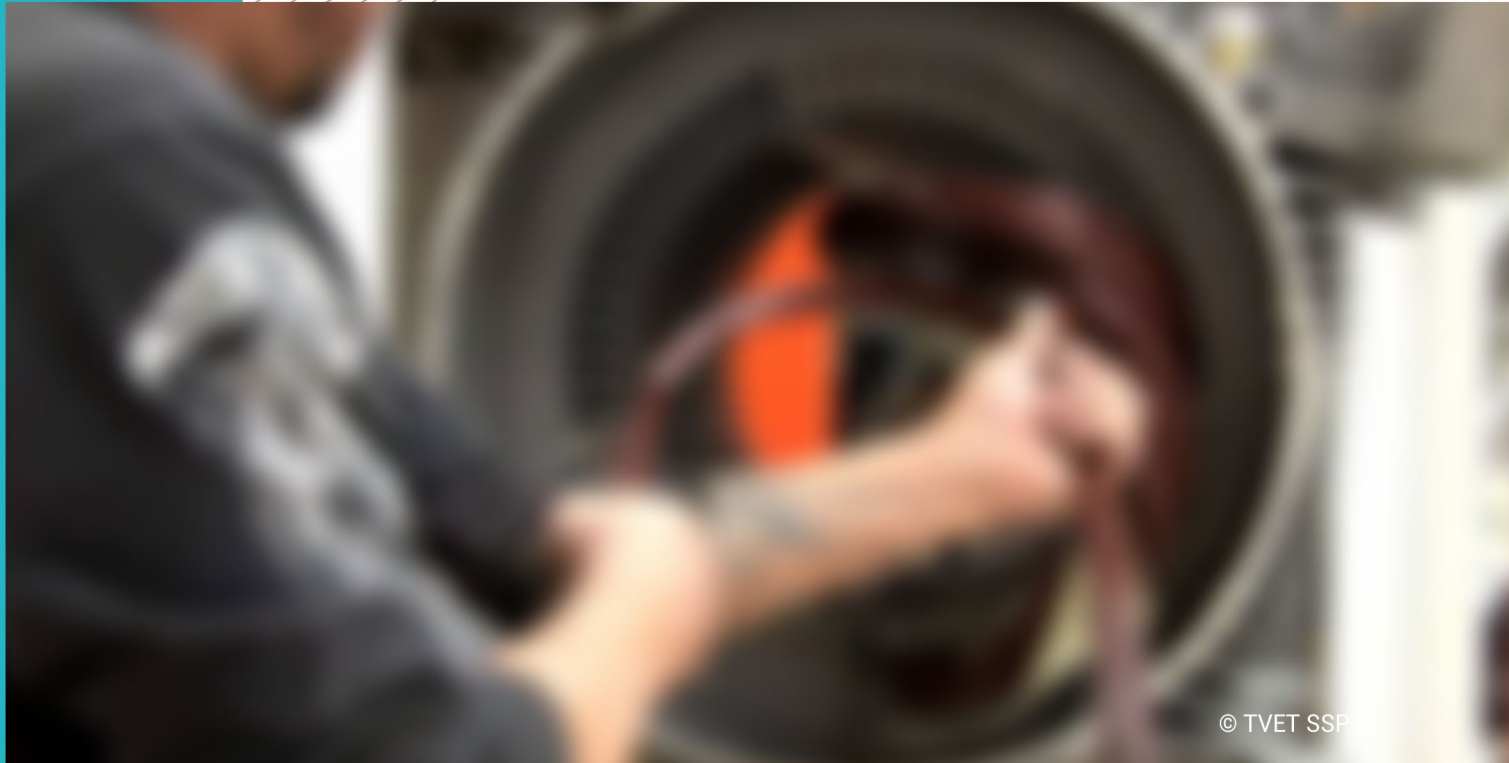
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ELECTRICAL MACHINE WINDING TECHNICIAN



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TRAINER GUIDE

National Vocational Certificate Level 3

Version 1 - September, 2018



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Introduction

In traditional approach there was a gap between the curricula and the market needs. While Competence-based training helps to bridge the gap between what is taught in training and what tasks will be performed on the job. Training trainees to perform actual job functions helps to ensure that future front-line workers have the skills, knowledge and abilities required to perform their jobs properly, safely and effectively. In addition to competence-based training, assessment based on the performance of actual work competencies helps to ensure that:

- Trainees are performing their work tasks as safely as possible
- Performance gaps are recognized prior to serious incidents
- Training can be implemented to improve competence.

There are significant benefits to competence-based training:

Cost effectiveness

Since training activities and assessments in a competence-based approach are goal-oriented, trainers focus on clearly defined areas of skills, knowledge and understanding that their own industry has defined in the competence standards. At the same time, trainees are more motivated to learn when they realize the benefits of improved performance.

Efficiency

The transfer gap between the training environment and working on the job is reduced substantially in a competence-based approach. This is because training and assessment are relevant to what needs to be done on the job. As a result, it takes less time for trainees to become competent in the required areas. This, in turn, contributes to improved efficiency where training and assessment are concerned.

Increased productivity

When trainees become competent in the competence standards that their own industry has defined, when they know what the performance expectations are and receive recognition for their abilities through successful assessments, they are likely to be more motivated and experience higher job satisfaction. The result is improved productivity for organizations. The communication and constructive feedback between future employers and employees will improve as a result of a competence-based approach, which can also increase productivity.

Reduced risk

Using a competence-based approach to training, development, and assessment, employers are able to create project teams of people with complementary skills. A trainee's record of the skills, knowledge and understanding relating to the competence standards they have achieved can be used by a future employer to identify and provide further relevant training and assessment for new skills areas. Competence standards can shape employee development and promotional paths within an organization and give employees the opportunity to learn more competencies beyond their roles. It can also provide organizations with greater ability to scale and flex as needed, thereby reducing the risk they face.

Increased customer satisfaction

Employees who have been trained and assessed using a competence-based approach are, by the definition of the relevant competence standards, able to perform the required tasks associated with a job. The knock-on effect is that, in service-related industries, they are able to provide high service levels, thereby increasing customer satisfaction. In production or manufacturing industries, they are able to work closely to industry standards in a more effective and efficient way.

Lesson plans

This manual provides a series of lesson plans that will guide delivery of each module for the **Electrical Machine Winding Technician qualification**. It is important for trainers to be flexible and be ready to adapt lesson plans to suit the context of the subject and the needs of their trainees. A simple lesson plan format is given below for your guidance .the Trainer will make it for very learning unit.

Good teachers acknowledge that CBT means each and every trainee in the class learns at a different speed. The good teacher is prepared to throw aside the day's lesson plan and do something different (and unplanned) for the class even if it means 'writing' a lesson plan for each trainee to match their learning pace for that day or week.

Learning by doing is different from learning theory and then applying it. To learn to do something, trainees need someone looking over their shoulder saying 'it's not quite like that, it's like this', 'you do it like this because ...', or even 'tell me why you chose to do it like this?'

In this way, trainees learn that theoretical knowledge is meaningless if it is not seen in the context of what they are doing. In other words, if a trainee doesn't know why they do something, they will not do it competently (skills underpinned by knowledge = competent performer).

This is how an **Electrical Machine Winding Technician** *acquires* a practical grasp of the standards expected. It's not by learning it in theory, but because those standards are acquired through correction by people who show what the standards are, and correct the trainee where they do not meet those standards, and where they repeat it correction until they have internalized those standards.

Demonstration of skill

Demonstration or modeling a skill is a powerful tool, which is used, in vocational training. The instructions for trainers for demonstration are as under:

- a) Read the procedure mentioned in the Trainer Guide for the relevant Learning Unit before demonstration.
- b) Arrange all tools, equipment and consumable material, which are required for demonstration of a skill.
- c) Practice the skill before demonstration to trainees, if possible.
- d) Introduce the skill to trainees clearly at the commencement of demonstration.
- e) Explain how the skill relates to the skill(s) already acquired and describe the expected results or show the objects to trainees.
- f) Carry out demonstration in a way that can be seen by all trainees.
- g) Use the same tools and materials that the learner will be using.
- h) Go through EACH of the steps involved in performing the skill.
- i) Go SLOWLY - describe each step as it is completed.
- j) Encourage the learners to move around and watch what you are doing from a number of different angles.
- k) Identify critical or complex steps, or steps that involve safety precautions to be followed.
- l) Explain theoretical knowledge where applicable and ask questions to trainees to test their understanding.
- m) Try to involve the learners: Ask them questions about why they think the process may work that way.
- n) Repeat critical steps in demonstration, if required.
- o) Summarize the demonstration by asking questions to trainees.

Involvement in the process (actively seeing) is important at this stage. When you work on getting involved, getting people to participate, you make them a part of what is happening. Questions for clarification or explanation are important throughout the demonstration. It is up to the learners to ask questions about things they do not understand, but it is also important for trainers to seek out and elicit questions from learners. A trainer may need to do repeated demonstrations of difficult or complex skills.

Remember that the learner will learn a lot from your demonstration - and not just the demonstration itself. Learners will learn about how to perform the skills, but they will also learn from watching demonstrations how trainers treat the tools or materials and how they follow safety procedures.

After the demonstration, it is important to again seek out questions - be sure all questions are answered. The trainer should ask the learner if they are ready to try the skill. If not, there may be a need for recycling the demonstration (or part of it), and clarifying some of the information.

Overview of the program

Course: NVQ Certificate Level 3: Electrical Machine Winding Technician	Total Course Duration: 67 Credit hours
Course Overview:	
<p>The purpose of the training (level 1-4) in Electrical Machine Winding Technician is to provide skilled manpower to improve the existing capacity of Electrical sector. This training will provide the requisite skills, knowledge and ability to the trainees to Repair/replace allied parts & rewind Electrical Machines (Motor & Transformer). It will enable the participants to meet the challenges in the field as Electrical Machine Winding Technician in the industry. Furthermore, it would improve the skill level of the technician and will prepare such a competitive skilled workforce who will be globally acceptable.</p>	

Module	Learning Unit	Duration
<p>Module A: Disassemble Machine at Workshop</p> <p>Aim: The aim of this module is to develop basic knowledge, skills and understanding required to shift machine to the work bench, Perform marking for Positions of Parts, Perform numbering on Machine parts as per Inventory Record, Remove the faulty parts and Ensure safe and Sequential Placing of healthy parts of Machine</p>	<p>LU1. Prepare for work to disassemble machine at workplace</p> <p>LU2. Shift Machine to work bench</p> <p>LU3. Perform marking for Positions of Parts</p> <p>LU4. Perform numbering on Machine parts as per Inventory Record</p> <p>LU5. Remove the faulty parts</p> <p>LU6. Ensure safe and Sequential Placing of healthy parts of Machine</p>	90

Module	Learning Unit	Duration
<p>Module B: Diagnose fault of machine (motor)</p> <p>Aim: The aim of this module is to develop basic knowledge, skills and understanding required to Diagnose fault of machine (motor) through checking alignment of rotar shaft, bearing bush of machine and identify faulty parts of machine.</p>	<p>LU1. Prepare for work to diagnose fault of machine (Motor)</p> <p>LU2. Verify inspection test (on site test) results of machine</p> <p>LU3. Check Alignment of Rotor Shaft</p> <p>LU4. Check Bearing/ Bush of Machine</p> <p>LU5. Update Test Results of Machine</p> <p>LU6. Identify the Faulty Parts of Machine</p>	<p>90</p>

Module	Learning Unit	Duration
<p>Module C: Estimate repair /replacement cost</p> <p>Aim: The aim of this module is to develop basic knowledge, skills and understanding required to estimate the accumulative cost of repair on machine and liaise with the client/customer on the said repair cost of the machine.</p>	<p>LU1. Prepare for work to estimate repair/replacement cost</p> <p>LU2. Estimate Cost of the required Materials</p> <p>LU3. Estimate Transportation Charges</p> <p>LU4. Estimate Labour Cost of the materials</p> <p>LU5. Calculate accumulative cost of the materials</p> <p>LU6. Liaise with client /customer on repair cost</p> <p>LU7. Arrange the required Materials / Parts</p>	<p>50</p>

Module	Learning Unit	Duration
<p>Module D: Perform Motor Rewinding</p> <p>Aim: The aim of this module is to develop basic knowledge, skills and understanding required to Perform Motor Rewinding through removing the coils,preparation of core for rewinding,interpretation of winding diagram,making of Former for coil winding,setting of coils in the core slots,interlinking of coils as per number of poles, binding of coils and baking of winding.</p>	<p>LU1. Prepare for work to perform motor rewinding</p> <p>LU2. Shift Faulty part of Motor to work Bench</p> <p>LU3. Remove the Winding Coils</p> <p>LU4. Collect the required Materials for Rewinding</p> <p>LU5. Prepare Core for Rewinding</p> <p>LU6. Interpret Winding Diagram</p> <p>LU7. Make a Former for Coil Winding</p> <p>LU8. Prepare Coil Winding Machine for Rewinding</p> <p>LU9. Set the Coils in the Core slots</p> <p>LU10. Interlink Coils as per number of Poles</p> <p>LU11. Perform Winding Tests</p> <p>LU12. Perform Binding of Coils</p> <p>LU13. Conduct Baking of Winding</p> <p>LU14. Verify Winding Tests</p>	<p>110</p>

Module	Learning Unit	Duration
<p>Module E: Perform Transformer Rewinding</p> <p>Aim: The aim of this module is to develop basic knowledge, skills and understanding required to Perform Transformer winding through collection of coils,preparation of Former for coil winding,Reassembly of coils on the core ,making connections as per rating plate of transformer,calculation of transformer turn ratio and baking of live part/coil assembly of transformer.</p>	<p>LU1. Prepare for work to perform transformer rewinding</p> <p>LU2. Collect Faulty Coil of Transformer</p> <p>LU3. Compile data of Faulty Transformer Coil / Coils</p> <p>LU4. Collect the required Materials for Re-winding</p> <p>LU5. Prepare Former for Coil Winding</p> <p>LU6. Prepare Coil on Winding Machine</p> <p>LU7. Re- Assemble the Coil on Core</p> <p>LU8. Make Connections as per rating plate of Transformer</p> <p>LU9. Calculate Turn Ratio of Transformer</p> <p>LU10. Conduct Baking of live part/Coil Assembly of Transformer</p>	<p>110</p>

Module	Learning Unit	Duration
<p>Module F: Carry out Re- Assembly of Machine</p> <p>Aim: The aim of this module is to develop basic knowledge, skills and understanding to Carry out Re-Assembly of Machine.</p>	<p>LU1. Prepare for work to carryout re- assembly of machine</p> <p>LU2. Arrange parts of the Machine</p> <p>LU3. Re-assemble the Machine</p> <p>LU4. Ensure Quality of Repair Work</p> <p>LU5. Ensure safe storing/placing of Machine</p> <p>LU6. Tag the Machine ready for delivery</p>	70
<p>Module G: Apply Work Health and Safety Practices (WHS)</p> <p>Aim: The aim of this module is to develop basic knowledge, skills and understanding required to apply Work Health and Safety Practices (WHS) imperative to maintain safe and healthy environment at the work place.</p>	<p>LU1. Implement safe work practices at work place</p> <p>LU2. Participate in hazard assessment activities a work place</p> <p>LU3. Follow emergency procedures at workplace</p> <p>LU4. Participate in OHS consultative processes</p>	30 hours
<p>Module H: Identify and Implement Workplace Policy and Procedures</p> <p>Aim: The aim of this module is to develop basic knowledge, skills and understanding required to identify and implement work place policy and procedure in the work shop.</p>	<p>LU1. Identify workplace policy & procedures</p> <p>LU2. Implement workplace policy & procedures</p> <p>LU3. Communicate workplace policy& procedures</p> <p>LU4. Review the implementation of workplace policy & procedures</p>	20 hours

Module	Learning Unit	Duration
<p>Module I: Communicate at Workplace</p> <p>Aim: The aim of this module is to develop basic knowledge, skills and understanding required to communicate within and outside the organization effectively.</p>	<p>LU1. Communicate within the organization</p> <p>LU2. Communicate outside the organization</p> <p>LU3. Communicate effectively in workgroup</p> <p>LU4. Communicate in writing</p>	30 hours
<p>Module J: Perform Computer Application Skills</p> <p>Aim: The aim of this module is to develop basic knowledge, skills and understanding required to Perform Computer Application Skills for preparation of in page ,spreadsheet,MS Office documents,computer garphics and creation of email account.</p>	<p>LU1. Prepare In-page documents as per required information</p> <p>LU2. Prepare Spreadsheets as per required information</p> <p>LU3. Use MS Office as per required information</p> <p>LU4. Perform computer graphics in basic applications</p> <p>LU5. Create Email account for communications</p>	40

Module	Learning Unit	Duration
<p data-bbox="304 248 862 284">Module K: Manage Personal Finances</p> <p data-bbox="188 341 947 483">Aim: The aim of this module is to develop basic knowledge, skills and understanding to Prepare personal budget and identify ways to maximize future Finances.</p>	<p data-bbox="1041 240 1563 276">LU1. Develop a personal budget</p> <p data-bbox="1041 292 1574 376">LU2. Develop long term personal budget</p> <p data-bbox="1041 392 1581 483">LU3. Identify ways to maximize future finances</p>	<p data-bbox="1675 248 1720 284">30</p>

Lesson Plan Template - EXAMPLE

Module			
Learning unit			
Learning outcome			
Methods	Key Notes	Media	Time
Introduction			
Introduce the topic and its daily applications to motivate the learner to attain his/her full consideration towards the topic. Recall the previous lesson and then connect with new topic.			
Main Body			
Present the new information .divide the topic into small section like define, describe To make learning as well as delivering easy .demonstrate the skill relevant to the learning unit.			
Conclusion			
Summarize the complete lesson to memorize the learners the key notes.			
ASSESSMENT			
How this lesson will be assessed? Feedback from students and for students.			
Total time			

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Module-E

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Module E: Perform Transformer Rewinding

Learning Unit 6 >. Prepare Coil on Winding Machine

Learning Outcomes>Trainee will be able to:

- **Wear the required PPE's**
- **Pick the required tools and equipment**
- **Collect former**
- **Fix former on winding machine**
- **Collect required winding material**
- **Wrap two, three layers of insulation paper as per requirement (latheroid / impregnated/diamond dotted/ cable paper) on the former**
- **Fasten one end of winding wire with former**
- **Put small pieces of cotton tape on former for coil binding**
- **Wind quarter length of coil**
- **Pull the cotton tape to bind the wound turns**
- **Complete winding of first layer of coil**
- **Wrap latheroid paper over first layer of coil**
- **Complete winding of all coil layers according to number of turns**
- **Bind the coil with cotton tape**
- **Apply varnish on last / end layer of coil**
- **Remove the former from winding machine**
- **Remove the former from the coil**
- **Update record**

Methods :Presentation/Lecture(Theory),Demonstration(practical)	Key Notes: Prepare Coil on Winding Machine	Media: presentation	Multimedia	Time: 03 hrs.
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Introduction Time: 30 Minute

Introduce the topic and its daily applications to motivate the learner by videos/quotes/or through brain storming and then connect the topic with previous one to establish connection with previous lesson/unit and new one to attain his/her full consideration towards the topic.

Objectives. After completing the Learning unit you will be able to **Prepare Coil on Winding Machine.**

Main Body

Time: 2:00 hrs.

- Explain why do we Fix former on winding machine
- Discuss why do we Put small pieces of cotton tape on former for coil binding.
- Explain the importance of Wrapping latheroid paper over first layer of coil
- Why it is important to Apply varnish on last / end layer of coil
- Describe importance of Binding the coil with cotton tape
- **Group Activity:** what will happen if we don't **Apply varnish on last / end layer of coil**

• **Group Discussion**

Conclusion

Time: 15 Minute.

Summarize the topic and discussion

Assessment Time :15 Minute

Questions Answering Session

Total time:03 hrs

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Module-A

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Trainer's guidelines

Module A: 0713001129 Disassemble Machine at Workshop			
Learning Unit	Suggested Teaching/ Learning Activities	Delivery Context	Media
LU1. Prepare for work to disassemble machine at workplace	Description/Demonstration: <ul style="list-style-type: none"> ○ Give a brief description on the importance of Preparation for work to disassemble machine at workplace ○ Perform demonstration of the following to: <ul style="list-style-type: none"> ● Identify the required PPE's ● Collect the required PPE's ● Identify the required tools and equipment ● Collect the required tools and equipment 	Classroom/ lab with Multi media	<ul style="list-style-type: none"> ○ Learner guide ○ All PPE ready available ○ Handouts Regarding to personal protective Equipment. ○ Tools/Equipment

- Ensure functional condition of PPE's/Tools and equipment
- Ensure safe working conditions
 - Clear Passage
 - Cleanliness
 - Adequate light Ventilation
- **Activity:**

Divide the Trainees into small groups and allocate at least **one key topic** to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record **three main points** from their discussions that relate to **their key topic**

After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes **on the flip chart** to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.

- **Assessment:**

Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding.

<p>LU2. Shift Machine to work Bench</p>	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ Explain the procedure for Shifting of Machine to the workbench ○ Perform demonstration of the following to: <ul style="list-style-type: none"> ● Wear the required PPE's ● Pick the required tools and equipment 	<p>Classroom/ lab with Multi media</p>	<ul style="list-style-type: none"> ○ Learner guide ○ All PPE ready available ○ Handouts Regarding to personal protective Equipment. ○ Tools/Equipment
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- Ensure safe shifting of machine to work bench
- Record shifting of machine to work bench
- **Activity:**

Divide the Trainees into small groups and allocate at least **one key topic** to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record **three main points** from their discussions that relate to **their key topic**

After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes **on the flip chart** to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.

- **Assessment:**

Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding.

<p>LU3. Perform marking for Positions of Parts</p>	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ Explain why do we Perform marking for Positions of Parts ○ Perform demonstration of the following to: <ul style="list-style-type: none"> ● Wear the required PPE's ● Pick the required tools and equipment ● Identify the parts to be marked for position marking ● Perform marking for position of parts as per machine catalogue ● Activity: <p>Divide the Trainees into small groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic</p> <p>After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.</p> <ul style="list-style-type: none"> ● Assessment: <p>Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding.</p>	<p>Classroom/ lab with Multi media</p>	<ul style="list-style-type: none"> ○ Learner guide ○ All PPE ready available ○ Handouts Regarding to personal protective Equipment. ○ Marking Tools/Equipment &Materials
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<p>LU4. Perform numbering on Machine parts as per Inventory Record</p>	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ Explain why do we Perform numbering on Machine parts as per Inventory Record ○ Perform demonstration of the following to: <ul style="list-style-type: none"> ● Wear the required PPE's ● Pick the required tools and equipment ● Identify the parts of machine for allotment of specific number ● Perform numbering on machine parts as per inventory record ● Activity: <p>Divide the Trainees into small groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic</p> <p>After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.</p> <ul style="list-style-type: none"> ● Assessment: <p>Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding.</p>	<p>Classroom/ lab with Multi media</p>	<ul style="list-style-type: none"> ○ Learner guide ○ All PPE ready available ○ Handouts Regarding to personal protective Equipment. ○ Marking/numbering Tools/Equipment &Materials
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<p>LU5. Remove the Faulty Parts</p>	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ Give presentation on the removal procedure of Faulty parts of machine. ○ Perform demonstration of the following to: <ul style="list-style-type: none"> ● Wear the required PPE's ● Pick the required tools and equipment ● Identify faulty parts of machine ● Remove the faulty parts of machine ● Mark specific numbering on faulty parts of machine ● Activity: <p>Divide the Trainees into small groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic</p> <p>After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.</p> <ul style="list-style-type: none"> ● Assessment: <p>Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding.</p>	<p>Classroom/ lab with Multi media</p>	
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<p>LU6. Ensure safe and Sequential Placing of healthy parts of Machine</p>	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ Explain the steps initiated for Ensuring safe and Sequential Placing of healthy parts of Machine ○ Perform demonstration of the following to: <ul style="list-style-type: none"> ● Wear the required PPE's ● Pick the required tools and equipment ● Mark specific numbering on healthy parts of machine ● Place healthy parts of machine at safe place in sequential order ● Record the placement/location of healthy parts ● Activity: <p>Divide the Trainees into small groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic</p> <p>After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.</p> <ul style="list-style-type: none"> ● Assessment: <p>Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding.</p>	<p>Classroom/ lab with Multi media</p>	<ul style="list-style-type: none"> ○ All PPE ready available ○ Handouts Regarding to personal protective Equipment
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Module-B

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Module B: 0713001131 Diagnose Fault of Machine (Motor)			
Learning Unit	Suggested Teaching/ Learning Activities	Delivery Context	Media
LU1. Prepare for work to diagnose fault of machine	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ Give a brief description on the importance of Preparation for work to diagnose fault of machine ○ Perform demonstration of the following to: <ul style="list-style-type: none"> ● Identify the required PPE's ● Collect the required PPE's ● Identify the required tools and equipment ● Collect the required tools and equipment ● Ensure functional condition of PPE's/Tools and equipment ● Ensure safe working conditions ➤ Clear Passage ➤ Cleanliness ➤ Adequate light Ventilation ● Activity: <p>Divide the Trainees into small groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three</p>	Classroom/ lab with Multi media	<ul style="list-style-type: none"> ○ Learner guide ○ All PPE ready available ○ Handouts Regarding to personal protective Equipment. ○ Tools/equipment

	<p>main points from their discussions that relate to their key topic</p> <p>After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.</p> <ul style="list-style-type: none"> • Assessment: <p>Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding.</p>		
<p>LU2. Verify Pre inspection test on site</p>	<p>Description/Demonstration:</p> <p>Explain why Verification of</p>	<p>Classroom/ lab with Multi media</p>	<ul style="list-style-type: none"> ○ All PPE ready available

<p>test results of machine</p>	<p>pre inspection test (on site test) results of machine is carried out.</p> <ul style="list-style-type: none"> ○ Perform demonstration of the following to: <ul style="list-style-type: none"> ● Wear the required PPE's ● Pick the required tools and equipment ● Verify / Check numbering on machine parts as per inventory record ● Perform testing with Megger <ul style="list-style-type: none"> ➤ Ground/Earth Fault ➤ Short Circuit ➤ Open Circuit ● Record test result ● Compare both the on site and current test results ● Activity: <p>Divide the Trainees into small groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic</p> <p>After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the</p>		<ul style="list-style-type: none"> ○ Handouts Regarding to personal protective Equipment. ○ Measuring Tools/equipment(Megger)
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	<p>front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.</p> <ul style="list-style-type: none"> • Assessment: <p>Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding.</p>		
<p>LU3. Check Alignment of rotor shaft</p>	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ Describe the procedure for Checking Alignment of Rotor Shaft 	<p>Classroom/ lab with Multi media</p>	<ul style="list-style-type: none"> ○ All PPE ready available ○ Handouts Regarding to personal protective Equipment. ○ Tools/equipment required for alignment of rotar shaft

	<ul style="list-style-type: none"> ○ Perform demonstration of the following to: <ul style="list-style-type: none"> ● Wear the required PPE's ● Pick the required tools and equipment ● Check alignment of rotor shaft with the help of dial gauge ● Check the rotor shaft size as per bearing size ● Check run out of the rotor shaft ● Record result ● Activity: <p>Divide the Trainees into small groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic</p> <p>After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make</p>		
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	<p>additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.</p> <ul style="list-style-type: none"> • Assessment: <p>Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding.</p>		
<p>LU4. Check Bearing / Bush of Machine</p>	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ Describe the procedure for Checking Bearing/ Bush of Machine ○ Perform demonstration of the following to: <ul style="list-style-type: none"> • Wear the required PPE's • Pick the required tools and equipment • Inspect the bearing/bush for <ul style="list-style-type: none"> ➤ noise ➤ Axial/Radial Play/Looseness ➤ Stickiness ➤ Lubrication 	<p>Classroom/ lab with Multi media</p>	<ul style="list-style-type: none"> ○ All PPE ready available ○ Handouts Regarding to personal protective Equipment. ○ Tools/equipment required for checking Bearing/ Bush of Machine

	<ul style="list-style-type: none">➤ Breakage• Check bearing / bush of machine• Record result• Activity: <p>Divide the Trainees into small groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic</p> <p>After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.</p>		
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	<ul style="list-style-type: none"> • Assessment: Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding. 		
<p>LU5. Update Test Result of Machine</p>	<p>Description/Demonstration: State importance of Updation of Test Results Of Machine Perform demonstration of the following to:</p> <ul style="list-style-type: none"> • Collect pre inspection test results of machine • Collect test results of machine conducted in workshop • Update test results of machine • Activity: Divide the Trainees into small groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic <p>After the discussion, begin the feedback session. Facilitate all the</p>	<p>Classroom/ lab with Multi media</p>	

	<p>groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.</p> <ul style="list-style-type: none"> • Assessment: Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding. 		
<p>LU6. Identify the Faulty Parts of Machine</p>	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ Explain procedure for identification of the Faulty Parts of Machine ○ Perform demonstration of the following to: 	<p>Classroom/ lab with Multi media</p>	<ul style="list-style-type: none"> ○ All PPE ready available ○ Handouts Regarding to personal protective Equipment.

	<ul style="list-style-type: none"> • Check test results of machine • Identify faulty parts of machine • Perform Numbering on faulty parts of machine according to inventory record • Tag faulty parts of machine • Activity: <p>Divide the Trainees into small groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic</p> <p>After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to</p>		
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Module-C

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	<p>create a handout for distribution amongst all the learners.</p> <ul style="list-style-type: none"> • Assessment: Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding 		
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Module C: 0713001130 Estimate Repair / Replacement Cost			
Learning Unit	Suggested Teaching/ Learning Activities	Delivery Context	Media
<p>LU1. Prepare for work to estimate repair/replacement cost</p>	<p>Description/Demonstration:</p> <p>Give a brief description on the importance of Preparation for work to to estimate repair/replacement cost</p> <ul style="list-style-type: none"> ○ Perform demonstration of the following to: • Identify the required stationary, equipment, software and materials • Collect the required stationary, equipment, software and materials 	<p>Classroom/ lab with Multi media</p>	<ul style="list-style-type: none"> ○ All PPE ready available ○ Handouts Regarding to personal protective Equipment. ○ Stationery items ○ Learner guide

- **Activity:**

Divide the Trainees into small groups and allocate at least **one key topic** to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record **three main points** from their discussions that relate to **their key topic**

After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes **on the flip chart** to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.

- **Assessment:**

Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding.

<p>LU2. Estimate Cost of the required Materials</p>	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ Explain why and how do we Estimate Cost of the required Materials ○ Perform demonstration of the following to: 	<p>Classroom/ lab with Multi media</p>	<ul style="list-style-type: none"> ○ Handouts Regarding to personal protective Equipment. ○ Stationery items ○ Learner guide ●
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- Prepare list of the materials/parts required for repair/replacement
- Estimate quantity of materials/faulty parts of machine
- Estimate cost of the required material/parts
- **Activity:**

Divide the Trainees into small groups and allocate at least **one key topic** to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record **three main points** from their discussions that relate to **their key topic**

After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes **on the flip chart** to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.

- **Assessment:**

Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding.

<p>LU3. Estimate Transportation Charges</p>	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ Explain why and how do we Estimate Cost of the Transportation Charges ○ Perform demonstration of the following to: <ul style="list-style-type: none"> ● Estimate transportation cost of pick and drop of machine ● Estimate transportation cost on collection/purchase of material/parts ● Activity: Divide the Trainees into small groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners. ● Assessment: Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding. 	<p>Classroom/ lab with Multi media</p>	<ul style="list-style-type: none"> ○ Handouts Regarding to personal protective Equipment. ○ Stationery items ○ Learner guide
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<p>LU4. Estimate Labour Cost of the materials</p>	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ Explain why and how do we Estimate Labour Cost of the materials ○ Perform demonstration of the following to: <ul style="list-style-type: none"> ● Estimate man hours for pick and drop of machine ● Estimate man hours for arrangement of material/parts ● Estimate man-hours required for repair work ● Activity: Divide the Trainees into small groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners. ● Assessment: Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding. 	<p>Classroom/ lab with Multi media</p>	
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<p>LU5. Calculate accumulative cost of the materials</p>	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ Explain the procedure for calculation of accumulative cost of the materials ○ Perform demonstration of the following to: <ul style="list-style-type: none"> ● Calculate the estimated costs: <ul style="list-style-type: none"> ➤ Material Cost ➤ Transportation Cost ➤ Labour Cost ➤ Overhead Charges ➤ Set the profit margin ● Calculate the accumulative cost ● Activity: <p>Divide the Trainees into small groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic</p> <p>After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.</p> <ul style="list-style-type: none"> ● Assessment: <p>Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding.</p>	<p>Classroom/ lab with Multi media</p>	<ul style="list-style-type: none"> ○ Calculator. ○ Stationery items ○ Learner guide
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<p>LU6. Liaise with client/customer on repair cost</p>	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ Arrange a dialogue on how to Liaise with client/customer on repair cost ○ Perform demonstration of the following to: <ul style="list-style-type: none"> ● Inform the client/customer about total cost ● Negotiate with the client/customer about total cost ● Finalize the total cost ● Make agreement with the client/customer ● Activity: <p>Divide the Trainees into small groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic</p> <p>After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.</p> <ul style="list-style-type: none"> ● Assessment: <p>Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding.</p>	<p>Classroom/ lab with Multi media</p>	<ul style="list-style-type: none"> ○ Calculator. ○ Stationery items ○ Learner guide
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<p>LU7. Arrange the required Materials/Parts</p>	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ Explain the procedure to arrange the required Materials/Parts ○ Perform demonstration of the following to: <ul style="list-style-type: none"> ● Collect list of the estimated material/parts for repair ● Check availability of the required parts/material in the store ● Place purchase order for the deficient parts/materials ● Activity: Divide the Trainees into small groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners. ● Assessment: Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding. 	<p>Classroom/ lab with Multi media</p>	<ul style="list-style-type: none"> ○ Calculator. ○ Stationery items ○ Learner guide
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Module-D

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Module D: 0713001132 Perform Motor Rewinding			
Learning Unit	Suggested Teaching/ Learning Activities	Delivery Context	Media
<p>LU1. Prepare for work to perform motor rewinding</p>	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ Give a brief description on the importance of Preparation for work to perform motor rewinding ○ Perform demonstration of the following to: <ul style="list-style-type: none"> ● Identify the required PPE's ● Collect the required PPE's ● Identify the required tools and equipment ● Collect the required tools and equipment ● Ensure functional condition of PPE's/Tools and equipment ● Ensure safe working conditions <ul style="list-style-type: none"> ➤ Clear Passage ➤ Cleanliness 	<p>Classroom/ lab with Multi media</p>	<ul style="list-style-type: none"> ○ Learner guide ○ All PPE ready available ○ Handouts Regarding to personal protective Equipment.

	<ul style="list-style-type: none">➤ Adequate light Ventilation• Activity: Divide the Trainees into small groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a		
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	<p>handout for distribution amongst all the learners.</p> <ul style="list-style-type: none"> • Assessment: <p>Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding.</p>		
<p>LU2. Shift Faulty part of Motor to Work bench</p>	<p>Description/Demonstration:</p> <p>Explain the procedure for Shifting Faulty part of Motor to work Bench</p> <ul style="list-style-type: none"> ○ Perform demonstration of the following to: <ul style="list-style-type: none"> • Wear the required PPE's • Pick the required tools and equipment • Locate faulty parts of motor • Perform shifting of faulty parts of motor to work bench <ul style="list-style-type: none"> • Activity: <p>Divide the Trainees into small</p>	<p>Classroom/ lab with Multi media</p>	<ul style="list-style-type: none"> ○ Learner guide ○ All PPE ready available ○ Handouts Regarding to personal protective Equipment. • Tools/equipment required for shifting of faulty machine

	<p>groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic</p> <p>After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.</p>		
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	<ul style="list-style-type: none"> ● Assessment: Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding. 		
<p>LU3. Remove the Winding Coils</p>	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ Prepare a presentation on how to remove the winding coils. ○ Perform demonstration of the following to: <ul style="list-style-type: none"> ● Wear the required PPE's ● Pick the required tools and equipment ● Perform marking at motor body for correct re-fitting at both ends ● Dis-assemble motor ● Store rotor and stator after appropriate tagging ● Cut fastening threads ● Record the connection details of stator coils 	<p>Classroom/ lab with Multi media</p>	<ul style="list-style-type: none"> ○ Learner guide ○ All PPE ready available ○ Handouts Regarding to personal protective Equipment. <p>Tools/equipment required to remove the winding coils of E/machine</p>

	<ul style="list-style-type: none"> • Locate faulty winding coils • Cut faulty winding coils from both ends of stator core • Remove faulty coils from stator core • Count / measure and record: <ul style="list-style-type: none"> ➤ Number of turns of each coil ➤ Pole pitch ➤ Coil span ➤ Weight of each coil Size of winding wire of each coil • Activity: <p>Divide the Trainees into small groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic</p> <p>After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their</p>		
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	<p>flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.</p> <ul style="list-style-type: none"> • Assessment: <p>Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding.</p>		
<p>LU4. Collect the required Materials for Rewinding</p>	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ Explain the procedure for Collecting the 	<p>Classroom/ lab with Multi media</p>	<ul style="list-style-type: none"> ○ Learner guide ○ All PPE ready available ○ Handouts Regarding to personal protective

	<p>required Materials for Rewinding</p> <ul style="list-style-type: none"> ○ Perform demonstration of the following to: <ul style="list-style-type: none"> • Wear the required PPE's • Pick the required tools and equipment • Estimate total weight of wire required for rewinding • Verify size of winding wire • Estimate length of required lathered paper • Prepare list of material required for rewinding • Collect the required material for rewinding • Update record • Activity: <p>Divide the Trainees into small groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic</p>		<p>Equipment.</p> <p>Tools/equipment and materials required for size verification of winding wire for re winding coils of E/machine</p>
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	<p>After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.</p> <ul style="list-style-type: none">• Assessment: Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to		
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	support their understanding.		
LU5. Prepare Core for Rewinding	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ Explain Core preparation techniques for Rewinding ○ Perform demonstration of the following to: <ul style="list-style-type: none"> ● Wear the required PPE's ● Pick the required tools and equipment ● Clean laminations of the core ● Set laminations of the core ● Perform marking on lathered paper according to size of core slots ● Perform cutting of lathered paper according to marking ● Insert lathered paper into core slots ● Activity: Divide the Trainees into small groups and allocate at least 	Classroom/ lab with Multi media	<ul style="list-style-type: none"> ○ All PPE ready available ○ Handouts Regarding to personal protective Equipment. <p>Tools/equipment and materials required for cleaning lamination of core, marking on lathered paper, cutting of lathered paper.</p>

	<p>one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic</p> <p>After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.</p>		
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• **Assessment:**

	<p>Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding.</p>		
<p>LU6. Interpret Wiring Diagram</p>	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ State the importance of interpretation of winding diagram ○ Perform demonstration of the following to: <ul style="list-style-type: none"> ● Wear the required PPE's ● Pick the required tools and equipment ● Collect winding data ● Interpret winding diagram ● Activity: <p>Divide the Trainees into small groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet</p>	<p>Classroom/ lab with Multi media</p>	<p>Winding diagram</p>

	<p>of flip chart paper to record three main points from their discussions that relate to their key topic</p> <p>After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.</p> <ul style="list-style-type: none">• Assessment: <p>Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and</p>		
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	develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding.		
LU7. Make a Former for Coil Winding	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ Prepare a presentation on how to make Former for Coil Winding ○ Perform demonstration of the following to: <ul style="list-style-type: none"> ● Wear the required PPE's ● Pick the required tools and equipment ● Collect winding data ● Collect the former of appropriate size ● Make / adjust former according to coil span ● Verify adjustment of former according to coil span ● Fix and adjust former according to coil span ● Activity: <p>Divide the Trainees into small</p>	Classroom/ lab with Multi media	<ul style="list-style-type: none"> ○ All PPE ready available ○ Handouts Regarding to personal protective Equipment. <p>Tools/equipment and materials required for Making a Former for Coil Winding</p>

	<p>groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic</p> <p>After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.</p>		
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• **Assessment:**

	<p>Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding.</p>		
<p>LU8. Prepare Coil Winding Machine for Rewinding</p>	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ Enlist steps for Preparation of Coil Winding Machine for Rewinding. ○ Perform demonstration of the following to: <ul style="list-style-type: none"> ● Wear the required PPE's ● Pick the required tools and equipment ● Collect the already adjusted former ● Collect relevant size winding wire ● Prepare required number of coil sets ● Calculate the total weight of winding coils 	<p>Classroom/ lab with Multi media</p>	<ul style="list-style-type: none"> ○ All PPE ready available ○ Handouts Regarding to personal protective Equipment. ○ Tools/equipment and materials required to Prepare Coil Winding Machine for Rewinding

	<ul style="list-style-type: none"> • Update record • Activity: <p>Divide the Trainees into small groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic</p> <p>After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution</p>		
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	<p>amongst all the learners.</p> <ul style="list-style-type: none"> • Assessment: <p>Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding.</p>		
<p>LU9. Set the Coils in the Core slots</p>	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ Describe the procedure for setting the coils in the core slots. ○ Perform demonstration of the following to: <ul style="list-style-type: none"> • Wear the required PPE's • Pick the required tools and equipment • Collect core and the sets of coils to be inserted in core • Insert coils one by one in the core slots according to winding diagram 	<p>Classroom/ lab with Multi media</p>	<ul style="list-style-type: none"> ○ All PPE ready available ○ Handouts Regarding to personal protective Equipment. ○ Tools/equipment and materials required for Setting the Coils in the Core slots

	<ul style="list-style-type: none">• Set the coils in core slots• Verify the sequence of coil insertion• Insert lathered paper or bamboo wedge to prevent coils from slipping out from the core slots• Activity: Divide the Trainees into small groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip		
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	<p>chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.</p> <ul style="list-style-type: none"> • Assessment: Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding. 		
<p>LU10. Inter link coils as per number of poles</p>	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ Explain the procedure for interlinking Coils as per number of Poles ○ Perform demonstration of the following to: <ul style="list-style-type: none"> • Wear the required PPE's • Pick the required tools 	<p>Classroom/ lab with Multi media</p>	<ul style="list-style-type: none"> ○ All PPE ready available ○ Handouts Regarding to personal protective Equipment. ○ Tools/equipment and materials required for removing insulation between overlapping coils, soldering the joints to Interlink Coils as per number of Poles

	<p>and equipment</p> <ul style="list-style-type: none">• Collect Core having coils inserted in it• Insert appropriate size sleeves on one side of coils ends• Remove varnish insulation from ends of coils• Interlink coils end as per number of poles and winding diagram• Connect supply leads according winding diagram with coils• Check that the coils have sound:<ul style="list-style-type: none">➤ Continuity➤ Insulation between overlapping coils➤ Insulation between coils and core• Verify the connections• Solder the joints• Slide sleeves over the joints to insulate the joint• Press the winding coils to ward outer edge of core		
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- **Activity:**

	<p>Divide the Trainees into small groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic</p> <p>After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.</p>		
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	<ul style="list-style-type: none"> • Assessment: Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding. 		
<p>LU11. Perform Winding Tests</p>	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ Explain the technique and importance for performing Winding test. ○ Perform demonstration of the following to: <ul style="list-style-type: none"> • Wear the required PPE's • Pick the required tools and equipment • Collect newly wound core • Perform winding test to verify <ul style="list-style-type: none"> ➤ Continuity ➤ Insulation between overlapping coils 	<p>Classroom/ lab with Multi media</p>	<ul style="list-style-type: none"> ○ All PPE ready available ○ Handouts Regarding to personal protective Equipment ○ Measuring Tools/equipment(Multi meter) and materials required for winding tests.

	<ul style="list-style-type: none"> ➤ Insulation between coil and core ➤ Megger Test <ul style="list-style-type: none"> • Activity: <p>Divide the Trainees into small groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic</p> <p>After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan</p>		
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	<p>of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.</p> <ul style="list-style-type: none"> • Assessment: Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding. 		
<p>LU12. Perform Binding of Coils</p>	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ Describe the procedure for binding of coils. ○ Perform demonstration of the following to: <ul style="list-style-type: none"> • Wear the required PPE's • Pick the required tools and equipment • Put latheroid paper between two coils to strengthen insulation on both sides of core ends • Perform binding of coil 	<p>Classroom/ lab with Multi media</p>	<ul style="list-style-type: none"> ○ All PPE ready available ○ Handouts Regarding to personal protective Equipment <p>Measuring Tools/equipment(Multi meter) and materials required for Binding of Coils</p>

	<p>with binding thread or cotton tape on both sides of core ends</p> <ul style="list-style-type: none">• Press the coil ends toward outer side of core• Verify that the coils have sound:<ul style="list-style-type: none">➤ Continuity➤ Insulation between each other➤ Insulation between coil and core• Activity:<p>Divide the Trainees into small groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic</p><p>After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have</p>		
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	<p>recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.</p> <ul style="list-style-type: none"> • Assessment: <p>Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding.</p>		
<p>LU13. Conduct Baking of Winding</p>	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ Explain the procedure and importance of Baking of Winding ○ Perform 	<p>Classroom/ lab with Multi media</p>	<ul style="list-style-type: none"> ○ All PPE ready available ○ Handouts Regarding to personal protective Equipment <p>Measuring Tools/equipment(Multi meter)</p>

	<p>demonstration of the following to:</p> <ul style="list-style-type: none"> • Wear the required PPE's • Pick the required tools and equipment • Varnish the winding • Verify that the coils have sound: <ul style="list-style-type: none"> ➤ Continuity ➤ Insulation between each other ➤ Insulation between coil and core • P5: Perform baking of winding • Activity: <p>Divide the Trainees into small groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic</p> <p>After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their</p>		<p>and materials required for backing of Coils</p>
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	<p>flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.</p> <ul style="list-style-type: none"> • Assessment: <p>Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding.</p>		
<p>LU14. Verify Winding Tests</p>	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ Describe procedure 	<p>Classroom/ lab with Multi media</p>	<ul style="list-style-type: none"> ○ All PPE ready available ○ Handouts Regarding to personal protective

	<p>and importance of Winding test verification.</p> <ul style="list-style-type: none"> ○ Perform demonstration of the following to: <ul style="list-style-type: none"> ● Wear the required PPE's ● Pick the required tools and equipment ● Perform winding tests to verify that the coils have: <ul style="list-style-type: none"> ➤ Continuity ➤ Insulation between each other Insulation between coil and core ● Activity: <p>Divide the Trainees into small groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic</p> <p>After the discussion, begin the feedback session. Facilitate all</p>		<p>Equipment</p> <ul style="list-style-type: none"> ○ Measuring Tools/equipment(Multi meter) and materials required for Verification of Winding Tests
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	<p>the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.</p> <ul style="list-style-type: none">• Assessment: Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding.		
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ELECTRICAL MACHINE WINDING TECHNICIAN



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Module-E

TRAINER GUIDE

National Vocational Certificate Level 3

Version 1 - September, 2018

Module E: 0713001133 Perform Transformer Rewinding			
Learning Unit	Suggested Teaching/ Learning Activities	Delivery Context	Media
LU1. Prepare work to perform transformer rewinding	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ Give a brief description on the importance of Preparation for work to perform Transformer rewinding ○ Perform demonstration of the following to: <ul style="list-style-type: none"> ● Identify the required PPE's ● Collect the required PPE's ● Identify the required tools and equipment ● Collect the required tools and equipment ● Ensure functional condition of PPE's/Tools and equipment ● Ensure safe working conditions <ul style="list-style-type: none"> ➤ Clear Passage ➤ Cleanliness ➤ Adequate light Ventilation ● Activity: <p>Divide the Trainees into small groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic</p> <p>After the discussion, begin the feedback</p>	Classroom/ lab with Multi media	<ul style="list-style-type: none"> ○ All PPE ready available ○ Handouts Regarding to personal protective Equipment ○ Measuring Tools/equipment(Multi meter) and materials required for Verification of Winding Tests

	<p>session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.</p> <ul style="list-style-type: none"> • Assessment: <p>Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding.</p>		
<p>LU2. Collect Faulty coil of Transformer</p>	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ Describe the procedure to collect Faulty Coil of Transformer . ○ Perform demonstration of the following to: <ul style="list-style-type: none"> • Wear the required PPE's • Pick the required tools and equipment • Remove cover of transformer • Identify faulty coil 	<p>Classroom/ lab with Multi media</p>	<ul style="list-style-type: none"> ○ All PPE ready available ○ Handouts Regarding to personal protective Equipment ○ Measuring Tools/equipment(Multi meter) and materials required for Verification of Winding Tests ○

	<ul style="list-style-type: none"> • Disconnect connections of faulty coil • Disassemble the channel of core • Remove the required part of core • Remove the faulty coil / coils from the limb of core • Ensure proper placing of removed coils • Update record • Activity: <p>Divide the Trainees into small groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic</p> <p>After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.</p> <ul style="list-style-type: none"> • Assessment: <p>Observe the students and give feedback to Improve their Knowledge and skill. Learners</p>		
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	<p>must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding.</p>		
<p>LU3. Compile Data of Faulty Transformer</p>	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ State importance of data compilation of Faulty Transformer ○ Perform demonstration of the following to: <ul style="list-style-type: none"> ● Wear the required PPE's ● Pick the required tools and equipment ● Collect the faulty coil ● Measure / calculate: <ul style="list-style-type: none"> ● Dimensions (Height, inner & outer diameter) of coil / coils ● Size of winding wire ● No of turns of coil ● Collect data from name plate of transformer ● Compile data of faulty coil / coils of transformer ● Update record ● Activity: Divide the Trainees into small groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main 	<p>Classroom/ lab with Multi media</p>	<ul style="list-style-type: none"> ○ All PPE ready available ○ Handouts Regarding to personal protective Equipment ○ Measuring Tools/equipment(Multi meter) and materials required for Verification of Winding Tests ○

	<p>points from their discussions that relate to their key topic</p> <p>After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.</p> <ul style="list-style-type: none"> • Assessment: <p>Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding.</p>		
<p>LU4. Collect the required Materials for Re-winding</p>	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ Explain the procedure for Materials collection required for Winding ○ Perform demonstration of the following to: 	<p>Classroom/ lab with Multi media</p>	<ul style="list-style-type: none"> ○ All PPE ready available ○ Handouts Regarding to personal protective Equipment ○ Measuring Tools/equipment(Multi meter) and

	<ul style="list-style-type: none"> • Wear the required PPE's • Pick the required tools and equipment • Prepare estimate of the required material for rewinding • Collect material required for rewinding • Update record • Activity: <p>Divide the Trainees into small groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic</p> <p>After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.</p> <ul style="list-style-type: none"> • Assessment: <p>Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their</p>		<p>materials required for Verification of Winding Tests</p> <ul style="list-style-type: none"> ○
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	<p>knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding.</p>		
<p>LU5. Prepare Former for Coil Winding</p>	<ul style="list-style-type: none"> ○ Description/Demonstration: ○ Explain the procedure for Former preparation for coil Winding. ○ Perform demonstration of the following to: <ul style="list-style-type: none"> ● Wear the required PPE's ● Pick the required tools and equipment ● Collect winding data ● Collect/Prepare former as per required dimensions(Volume) ● Verify the size of former according to the coil ● Activity: <p>Divide the Trainees into small groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic</p> <p>After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they</p>		<ul style="list-style-type: none"> ○ All PPE ready available ○ Handouts Regarding to personal protective Equipment ○ Measuring Tools/equipment(Multi meter) and materials required for Verification of Winding Tests ○

	<p>have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.</p> <ul style="list-style-type: none"> • Assessment: <p>Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding.</p>		
<p>LU6. Prepare coil on Winding Machine</p>	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ Give presentation on coil preparation on winding machine. ○ Perform demonstration of the following to: <ul style="list-style-type: none"> • Wear the required PPE's • Pick the required tools and equipment • Collect former • Fix former on winding machine • Collect required winding material • Wrap two, three layers of latheroid paper on the former 	<p>Classroom/ lab with Multi media</p>	<ul style="list-style-type: none"> ○ All PPE ready available ○ Handouts Regarding to personal protective Equipment ○ Measuring Tools/equipment(Multi meter) and materials required for Verification of Winding Tests

	<ul style="list-style-type: none"> • Fasten one end of winding wire with former • Put small pieces of cotton tape on former for coil binding • Wind quarter length of coil • Pull the cotton tape to bind the wound turns • Complete winding of first layer of coil • Wrap latheroid paper over first layer of coil • Complete winding of all coil layers according to number of turns • Bind the coil with cotton tape • Apply varnish on last / end layer of coil • Remove the former from winding machine • Remove the former from the coil • Update record • Activity: <p>Divide the Trainees into small groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic</p> <p>After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss</p>		
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	<p>these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.</p> <ul style="list-style-type: none"> • Assessment: <p>Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding.</p>		
<p>LU7. Re-Assemble the Coil on Core</p>	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ Explain the procedure for Re assembling the coil on core. ○ Perform demonstration of the following to: <ul style="list-style-type: none"> • Wear the required PPE's • Pick the required tools and equipment • Insert the wound coil over the limb of core • Assemble the opened layer of the core • Fit the channel on core • Fix the channel on core • Update record 	<p>Classroom/ lab with Multi media</p>	<ul style="list-style-type: none"> ○ All PPE ready available ○ Handouts Regarding to personal protective Equipment ○ Measuring Tools/equipment(Multi meter) and materials required for Verification of Winding Tests

	<ul style="list-style-type: none"> • Activity: Divide the Trainees into small groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners. • Assessment: Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding. 		
LU8. Make connections	Description/Demonstration: <ul style="list-style-type: none"> ○ Describe the importance of rating plate of transformer and carrying out of connections as 	Classroom/ lab with Multi media	<ul style="list-style-type: none"> ○ All PPE ready available ○ Handouts Regarding to personal protective

<p>as per rating plate of Transformer</p>	<p>per rating plate of the transformer.</p> <ul style="list-style-type: none"> ○ Perform demonstration of the following to: <ul style="list-style-type: none"> ● Wear the required PPE's ● Pick the required tools and equipment ● Make connection as per data / rating plate of transformer ● Perform joints soldering of coils connections ● Update record ● Activity: <p>Divide the Trainees into small groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic</p> <p>After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the</p>		<p>Equipment</p> <ul style="list-style-type: none"> ○ Measuring Tools/equipment(Multi meter) and materials required for Verification of Winding Tests ○
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	<p>learners.</p> <ul style="list-style-type: none"> • Assessment: <p>Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding.</p>		
<p>LU9. Calculate Turn Ration of Transformer</p>	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ Define Turn Ratio of transformer and explain the procedure for calculation of turn Ratio of transformer. ○ Perform demonstration of the following to: <ul style="list-style-type: none"> • Wear the required PPE's • Pick the required tools and equipment • Collect specifications from data / rating plate of transformer • Calculate turn ratio of transformer • Update record • Activity: <p>Divide the Trainees into small groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic</p> <p>After the discussion, begin the feedback</p>	<p>Classroom/ lab with Multi media</p>	<ul style="list-style-type: none"> ○ All PPE ready available ○ Handouts Regarding to personal protective Equipment ○ Measuring Tools/equipment(Multi meter) and materials required for Verification of Winding Tests ○

	<p>session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.</p> <ul style="list-style-type: none">• Assessment: Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding.		
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<p>LU10. Conduct Baking of live part / coil Assembly of Transformer</p>	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ Describe procedure for conduct of Baking of live part/coil of Transformer . ○ Perform demonstration of the following to: <ul style="list-style-type: none"> ● Wear the required PPE's ● Pick the required tools and equipment ● Place the transformer's coil assembly / live part in baking oven ● Set specific temperature of the baking oven ● Perform baking of coil assembly / live part ● Update record ● Activity: <p>Divide the Trainees into small groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic</p> <p>After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.</p> <ul style="list-style-type: none"> ● Assessment: <p>Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding.</p>	<p>Classroom/ lab with Multi media</p>	<ul style="list-style-type: none"> ○ All PPE ready available ○ Handouts Regarding to personal protective Equipment ○ Measuring Tools/equipment(Multi meter) and materials required for Verification of Winding Tests ○
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Module-F

TRAINER GUIDE

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Module F: 0713001134 Carry out Re-Assembly of Machine			
Learning Unit	Suggested Teaching/ Learning Activities	Delivery Context	Media
LU1. Prepare for work to carryout re-assembly of machine	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ Explain the importance of preparation for work to carryout re- assembly of machine ○ Perform demonstration of the following to: <ul style="list-style-type: none"> ● Identify the required PPE's ● Collect the required PPE's ● Identify the required tools and equipment ● Collect the required tools and equipment ● Ensure functional condition of PPE's/Tools and equipment ● Ensure safe working conditions <ul style="list-style-type: none"> ➤ Clear Passage ➤ Cleanliness ➤ Adequate light Ventilation 	Classroom/ lab with Multi media	<ul style="list-style-type: none"> ○ All PPE ready available ○ Handouts Regarding to personal protective Equipment ○ Measuring Tools/equipment(Multi meter) and materials required for Verification of Winding Tests

	<ul style="list-style-type: none">• Activity: Divide the Trainees into small groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.		
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	<ul style="list-style-type: none"> • Assessment: Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding. 		
<p>LU2. Arrange parts of the Machine</p>	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ Explain the procedure for arranging parts of the Machine ○ Perform demonstration of the following to: <ul style="list-style-type: none"> • Identify the required parts of machine • Collect the required parts • Count total number of parts for deficiency • Arrange parts of the machine in sequential order • Activity: Divide the Trainees into small groups and allocate at least one key topic to each group 	<p>Classroom/ lab with Multi media</p>	<ul style="list-style-type: none"> ○ All PPE ready available ○ Handouts Regarding to personal protective Equipment ○ Measuring Tools/equipment(Multi meter) and materials required for Verification of Winding Tests ○

	<p>for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic</p> <p>After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.</p> <ul style="list-style-type: none">• Assessment: <p>Observe the students and give feedback to Improve their</p>		
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	<p>Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding.</p>		
<p>LU3. Re-Assemble the Machine</p>	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ Prepare a presentation on Re- Assembling process of the Machine ○ Perform demonstration of the following to: <ul style="list-style-type: none"> ● Wear the required PPE's ● Pick the required tools and equipment ● Collect parts of machine in sequential order ● Perform Re-assembling of machine as per numbering of parts: ● Adjust/Align parts of machine as per marking ● Verify tightening of nut bolts with torque Wrench ● Activity: <p>Divide the Trainees into small groups and allocate at least</p>	<p>Classroom/ lab with Multi media</p>	<ul style="list-style-type: none"> ○ All PPE ready available ○ Handouts Regarding to personal protective Equipment ○ Measuring Tools/equipment(Multi meter) and materials required for Verification of Winding Tests ○

	<p>one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic</p> <p>After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.</p> <ul style="list-style-type: none"> • Assessment: <p>Observe the students and give</p>		
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	<p>feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding.</p>		
<p>LU4. Ensure Quality of Repair Work</p>	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ Explain importance of Ensuring Quality of Repair Work. ○ why we Perform marking for Positions of Parts ○ Perform demonstration of the following to: <ul style="list-style-type: none"> ● Wear the required PPE's ● Pick the required tools and equipment ● Perform physical inspection of the Re-Assembled Machine ● Perform Megger test of machine ● Energize/Power Up the machine ● Perform test run of machine ➤ Observe vibration 	<p>Classroom/ lab with Multi media</p>	<ul style="list-style-type: none"> ○ All PPE ready available ○ Handouts Regarding to personal protective Equipment ○ Measuring Tools/equipment(Multi meter) and materials required for Verification of Winding Tests ○

	<ul style="list-style-type: none"> ➤ Observe sound ➤ Measure Input current ➤ Observe Heat Check output • Activity: <p>Divide the Trainees into small groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic</p> <p>After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group discussion activity with a summary. Photograph or scan</p>		
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	<p>of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.</p> <ul style="list-style-type: none"> • Assessment: <p>Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding.</p>		
<p>LU5. Ensure Safe Storing / Placing of Machine.</p>	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ Describe procedure and importance of safe storing/placing of Machine ○ ○ Perform demonstration of the following to: <ul style="list-style-type: none"> • Wear the required PPE's • Pick the required tools and equipment • Prepare site for safe storage of machine 	<p>Classroom/ lab with Multi media</p>	<ul style="list-style-type: none"> ○ All PPE ready available ○ Handouts Regarding to personal protective Equipment ○ Measuring Tools/equipment(Multi meter) and materials required for Verification of Winding Tests ○

	<ul style="list-style-type: none"> • Collect machine from workbench • Shift machine to the safe storing site • Ensure safe storing/placing of machine • Activity: <p>Divide the Trainees into small groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic</p> <p>After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not</p>		
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	<p>identified. End the group discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.</p> <ul style="list-style-type: none"> • Assessment: <p>Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding.</p>		
<p>LU6. Tag the Machine ready for delivery</p>	<p>Description/Demonstration:</p> <ul style="list-style-type: none"> ○ Describe the importance of Tagging the Machine ready for delivery. ○ Perform demonstration of the following to: <ul style="list-style-type: none"> • Prepare delivery tags • Identify the machine to be tagged • Tag the machine • Update record • Prepare final bill of 	<p>Classroom/ lab with Multi media</p>	<ul style="list-style-type: none"> ○ All PPE ready available ○ Handouts Regarding to personal protective Equipment ○ Measuring Tools/equipment(Multi meter) and materials required for Verification of Winding Tests ○

	<p>repair</p> <ul style="list-style-type: none"> • Communicate client/customer regarding readiness of machine • Activity: Divide the Trainees into small groups and allocate at least one key topic to each group for discussion on the topic. Each group should use a sheet of flip chart paper to record three main points from their discussions that relate to their key topic <p>After the discussion, begin the feedback session. Facilitate all the groups one by one to come to the front of class with their flipcharts, display their flipcharts visible to all the learners and ask them to share their main points they have recorded for their key points. Discuss these main points briefly with the whole group. Learners should make additional notes on the flip chart to record additional points their group had not identified. End the group</p>		
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	<p>discussion activity with a summary. Photograph or scan of all the flipcharts and use these charts to create a handout for distribution amongst all the learners.</p> <ul style="list-style-type: none">• Assessment: Observe the students and give feedback to Improve their Knowledge and skill. Learners must be able to practice and develop their knowledge and skills relating to Work safely. Ensure that learners have the opportunity to ask questions to support their understanding.		
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Module-G

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Module G: Apply Work Health and Safety Practices (WHS)			
Learning Unit	Suggested Teaching/ Learning Activities	Delivery Context	Media
LU1. Implement safe work practices at work place	Description/Demonstration: Activity: Assessment:	Classroom/ lab with Multi media	<ul style="list-style-type: none"> ○ Learner guide ○ All PPE ready available ○ Handouts Regarding to personal protective Equipment.
LU2. Participate in hazard assessment activities a work place	Description/Demonstration: Activity: Assessment:	Classroom/ lab with Multi media	
LU3. Follow emergency procedures at workplace	Description/Demonstration: Activity:	Classroom/ lab with Multi media	

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Module-H

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LU4. Participate in OHS consultative processes	Assessment:	Classroom/ lab with Multi media	
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Module H: Identify and Implement Workplace Policy and Procedures			
Learning Unit	Suggested Teaching/ Learning Activities	Delivery Context	Media
LU1. Identify workplace policy & procedures	Description/Demonstration: Activity: Assessment:	Classroom/ lab with Multi media	
LU2. Implement workplace policy & procedures	Description/Demonstration: Activity: Assessment:	Classroom/ lab with Multi media	
LU3. Communicate workplace policy & procedures	Description/Demonstration: Activity: Assessment:	Classroom/ lab with Multi media	

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Module-I

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LU4. Review the implementation of workplace policy & procedures	Description/Demonstration: Activity: Assessment:	Classroom/ lab with Multi media	
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Module I: Communicate at Workplace			
Learning Unit	Suggested Teaching/ Learning Activities	Delivery Context	Media
LU1. Communicate within the organization	Description/Demonstration: Activity: Assessment:	Classroom/ lab with Multi media	
LU2. Communicate outside the organization	Description/Demonstration: Activity: Assessment:	Classroom/ lab with Multi media	
LU3. Communicate effectively in workgroup	Description/Demonstration: Activity: Assessment:	Classroom/ lab with Multi media	

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Module-J

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LU4. Communicate in writing	Description/Demonstration: Activity: Assessment:	Classroom/ lab with Multi media	
Module J: Perform Computer Application Skills			
Learning Unit	Suggested Teaching/ Learning Activities	Delivery Context	Media
LU1. Prepare In-page documents as per required information	Description/Demonstration: Activity: Assessment:	Classroom/ lab with Multi media	
LU2. Prepare Spreadsheets as per required information	Description/Demonstration: Activity: Assessment:	Classroom/ lab with Multi media	
LU3. Use MS Office as per required information	Description/Demonstration: Activity: Assessment:	Classroom/ lab with Multi media	
LU4. Perform	Description/Demonstration:	Classroom/ lab with Multi media	

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Module-K

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computer graphics in basic applications	Activity: Assessment:		
LU5. Create Email account for communications	Description/Demonstration: Activity: Assessment:	Classroom/ lab with Multi media	

Module K: Manage Personal Finances			
Learning Unit	Suggested Teaching/ Learning Activities	Delivery Context	Media
LU1. Develop a personal budget	Description/Demonstration: Activity: Assessment:	Classroom/ lab with Multi media	
LU2. Develop long term personal budget	Description/Demonstration: Activity: Assessment:	Classroom/ lab with Multi media	

<p>LU3. Identify ways to maximize future finances</p>	<p>Description/Demonstration:</p> <p>Activity:</p> <p>Assessment:</p>	<p>Classroom/ lab with Multi media</p>	
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Frequently Asked Questions

<p>1. What is Competency Based Training (CBT) and how is it different from currently offered trainings in institutes?</p>	<p>Competency-based training (CBT) is an approach to vocational education and training that places emphasis on what a person can do in the workplace as a result of completing a program of training. Compared to conventional programs, the competency based training is not primarily content based; it rather focuses on the competence requirement of the envisaged job role. The whole qualification refers to certain industry standard criterion and is modularized in nature rather than being course oriented.</p>
<p>2. What is the passing criterion for CBT certificate?</p>	<p>You shall be required to be declared “Competent” in the summative assessment to attain the certificate.</p>
<p>3. What are the entry requirements for this course?</p>	<p>The entry requirement for this course is level-2 qualification in Electrical Machine Winding Technician or equivalent.</p>
<p>4. How can I progress in my educational career after attaining this certificate?</p>	<p>You shall be eligible to take admission in a level-4 course in Electrical Machine Winding Technician</p>
<p>5. If I have the experience and skills mentioned in the competency standards, do I still need to attend the course to attain this certificate?</p>	<p>You can opt to take part in the Recognition of Prior Learning (RPL) program by contacting the relevant training institute and getting assessed by providing the required evidences.</p>
<p>6. What is the entry requirement for Recognition of Prior Learning program (RPL)?</p>	<p>There is no general entry requirement. The institute shall assess you, identify your competence gaps and offer you courses to cover the gaps; after which you can take up the final assessment.</p>
<p>7. Is there any age restriction for entry in this course or Recognition of Prior Learning program (RPL)?</p>	<p>There are no age restrictions to enter this course or take up the Recognition of Prior Learning program</p>
<p>8. What is the duration of this course?</p>	<p>The duration of the course work is 67 Credit hrs (670 Contact Hrs).</p>
<p>9. What are the class timings?</p>	<p>The classes are normally offered for 5 days a week (08:00 A.M to 01:00 PM) These may vary according to the practices of certain institutes</p>

10. What is equivalence of this certificate with other qualifications?	As per the national vocational qualifications framework, this is a level-3 certificate in Electrical Machine Winding Technician
11. What is the importance of this certificate in National and International job market?	This certificate is based on the nationally standardized and notified competency standards by National Vocational and Technical Training Commission (NAVTTTC). These standards are also recognized worldwide as all the standards are coded using international methodology and are accessible to the employers worldwide through NAVTTTC website.
12. Which jobs can I get after attaining this certificate? Are there job for this certificate in public sector as well?	You shall be able to take up jobs in Electrical Machine Winding Technician industries/workshops or you can start your own business in the field of Electrical Machine Winding
13. What are possible career progressions in industry after attaining this certificate?	You shall be able to progress up to the level of supervisor after attaining sufficient experience, knowledge and skills during the job. Attaining additional relevant qualifications may aid your career advancement to even higher levels.
14. Is this certificate recognized by any competent authority in Pakistan?	This certificate is based on the nationally standardized and notified competency standards by National Vocational and Technical Training Commission (NAVTTTC). The official certificates shall be awarded by the relevant certificate awarding body.
15. Is on-the-job training mandatory for this certificate? If yes, what is the duration of on-the-job training?	On-the-job training is not a requirement for final / summative assessment of this certificate. However, taking up on-the-job training after or during the course work may add your chances to get a job afterwards.
16. How much salary can I get on job after attaining this certificate?	The minimum wages announced by the Government of Pakistan in 2019 are PKR 17,500. This may vary in subsequent years and different regions of the country. Progressive employers may pay more than the mentioned amount.
17. Are there any alternative certificates which I can take up?	There are some short courses offered by some training institutes on this subject. Some institutes may still be offering conventional certificate courses in the field.
18. What is the teaching language of this course?	The teaching language of this course is local language and Urdu.
19. Is it possible to switch to other certificate programs during the course?	Yes, you can switch to other training courses after completion of certain levels in the field and can attain other qualifications in other courses.

20.What is the examination / assessment system in this program?	Competency based assessments are organized by training institutes during the course which serve the purpose of assessing the progress and preparedness of each student. Final / summative assessments are organized by the relevant qualification awarding bodies at the end of the certificate program. You shall be required to be declared “Competent” in the summative assessment to attain the certificate.
21.Does this certificate enable me to work as freelancer?	You can start your small business in the form of services delivery for winding of Electrical Machines (Motor and Transformer).You may need additional skills on entrepreneurship to support your initiative.

Test Yourself (Multiple Choice Questions)

Level- 3

Please mark the correct one from the given options.

Q : Select the appropriate answer.

- 1- **At what sequential order marking operation is performed in bench work?**
a)- 4th b)- 3rd c)- 2nd d)- 1st
- 2- **In what direction stroke of hacksaw, cutting takes place?**
a)- Forward b)-Backward c)- Both a & b d)- In any one direction
- 3- **What are the number of teeth per square inch in smooth file?**
a)- 20 b)- 30 c)- 40 d)- 50
- 4- **What is the name of process which produces holes?**
a)- Cutting b)- Reaming c)- Drilling d)- Riveting
- 5- **What will be the equivalent of One (1)meter in decimeters :**
a)- 0.1 b)- 10 c)-100 d)- 1000
- 6- **What will be the equivalent of 7 feet in meter ?**
a)- 0.0214 b)- 0.214 c)- 2.14 d)- 21.4

7- On standard wire gauge sizes ranges from 0 to:

- a)- 30 b)- 32 c)- 34 d)- 36

8- When using try square, the blade is positioned ,compared to the edge, at a degree of:

- a)- 30 b)- 60 c)- 90 d)- 120

9- Electrical energy is converted in to mechanical energy by ?

- a) Generator b) Alternator c) Transformer d) Motor

10- Which of the below motor can work both on AC & DC supply?

- a) Synchronous b) Universal c) Induction d) Shunt

11- Field and armature are connected in parallel in:?

- a) Series motor b) Compound motor c) Shunt motor d) Shaded pole motor

12- The phase displacement in three phase supply is?

- a) 30° b) 60° c) 90° d) 120°

13- in which of the below motor starter timer is used?

- a) Automatic star delta starter b) Manual star delta starter
c) Direct on line starter d) 3 point starter

14- When conductor cuts a magnetic flux; emf is induced in to it?

- a) Lenz law b) Faraday's law c) Kirchhoff's law d) Ohm's law

15-Formula of induced emf is :

- a) $E = B v / l$ b) $E = B l / v$ c) $E = B / l v$ d) $E = B l v$

16- Phase and line voltages are same in:

- a) Star Connection b) Series Connection c) Delta Connection d) Parallel Connection

17- Which one of the following is used to control fan speed?

- a) Capacitor b) Regulator c) Choke d) Relay

18- Which one of the below measuring instruments is used to measure insulation resistance of winding?

- a) Ohmmeter b) Ammeter c) Megger d) AVO meter

19- Which one of the below meters is used to measure current flowing without cutting the wire:

- a) Ammeter b) Tachometer c) Growler d) Tong tester

20-Speed of motor is measured with:?

- a) Ammeter b) Tachometer c) Growler d) Tong tester

21-Voltage is measured with :

- a) Ohmmeter b) Ammeter c) Megger d) AVO meter

22-The device mostly used for measuring winding size of wire is :

- a) SWG b) Steel rule c) Vernier caliper d) Growler

23-Winding wires are made up of ?

- a) Copper b) Iron c) Silver d) Gold

24-which of the below tools is used to cut insulation paper?

- a) Scriber b) Steel rule c) Scissors d) Files

25-Series board is used for:

- a) Supply of motor b) Testing of motor c) Setting of motor d) Protection of motor

26-The distance between two sides of coils is called:

- a) Pitch b) Pole c) Slot d) Segment

27-The device mostly used for motor over load protection is :

- a) Fuse b) Circuit breaker c) Switch d) Thermal relay

28-Chemical energy is converted in to Electrical energy by:

- a) Cell b) Generator c) Motor d) Alternator

29-To increase Voltage, cells are connected in?

- a) Parallel b) Series c) Shunt d) Cross

30-To increase current, cells are connected in?

- a) Parallel b) Series c) Shunt d) Cross

31-Combination of cells is called?

- a) Large cell b) Mini cell c) Battery d) Solar cell

32-Batteries must be dealt with:

- a) Careless b) Hydrometer c) Ammeter d) Care

33-The unit of electrical resistance is?

- a) Ampere b) Volt c) Ohm d) Watt

34-In winding wire lacing is usually made with thread made by:

- a) Copper b) Aluminium c) Cotton d) Waxed linen

35-Which of the below motor has carbon brush?

- a) Universal b) Capacitor Start c) Capacitor run d) Shaded pole

36-What type of material is used in making transformer core?

- a) Stainless steel b) Copper c) Aluminium d) Silicon steel

37-Which one below tests is performed to check the voltage ratio of transformer?

- a) Short Circuit b) Open Circuit c) Turn Ratio d) Insulation

38-What is used to regulate the voltage of transformer?

- a) Tap Changer b) Capacitor c) Buchholz Relay d) Bushings

39-What is used to provide insulation & cooling in transformer?

- a) Mobil Oil b) Mineral Oil c) Kerosene Oil d) Canola Oil

40-What is used in breather to avoid entrance of moisture in transformer?

- a) Simon Gel b) Fish Gel c) Petroleum Gel d) Silica Gel

Answers Key			
Number	Answer	Number	Answer
1	d	21	d
2	a	22	a
3	d	23	a
4	c	24	c
5	b	25	b
6	c	26	a
7	d	27	d
8	c	28	a
9	d	29	b
10	b	30	a
11	c	31	c
12	d	32	d
13	a	33	c
14	b	34	d
15	d	35	a
16	c	36	d
17	b	37	c
18	c	38	a
19	d	39	b
20	B	40	d

