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MINISTRY OF LABOR AND SKILLS

ELECTRICAL/ELECTRONICS EQUIPMENT SERVICING LEVEL – II

CURRICULUM

Based on October, 2021 (I -V) Occupational standard (OS)

March, 2022
Addis Ababa, Ethiopia

Preface

The reformed TVET-System is an outcome-based system. It utilizes the needs of the labor market and occupational requirements from the world of work as the benchmark and standard for TVET delivery. The requirements from the world of work are analyzed and documented – taking into account international benchmarking – as occupational standards (OS).

In the reformed TVET-System, curricula and curriculum development play an important role with regard to quality driven comparable TVET-Delivery. The Curricula help to facilitate the training process in a way, that trainees acquire the set of occupational competences (skills, knowledge and attitude) required at the working place and defined in the occupational standards (OS).

This curriculum has been developed by a group of professional experts from different Regional TVET Bureaus, colleges, Industries, Institutes and universities based on the occupational standard for **Electrical/Electronics Equipment Servicing**
Level II**.**

The curriculum development process has been actively supported and facilitated by **Ministry of Labor and Skills.**

TVET-Program Design

TVET-Program Title: Electrical/Electronic Equipment Servicing Level - II

1.1. TVET-Program Description

The Program is designed to develop the necessary knowledge, skills and attitude of the trainees to the standard required by the occupation. The contents of this program are in line with the occupational standard. The Trainees who successfully completed the Program will be qualified to work as a **Electrical Worker** with competencies elaborated in the respective OS. Graduates of the program will have the required qualification to work in the **Electro - Technology** sector in the field of **electrical/electronic equipment servicing.**

The prime objective of this training program is to equip the Trainees with the identified competences specified in the OS. Graduates are therefore expected to_Apply 5S Procedures, Perform electrical/Electronic Measurement and Calculation , Test Electrical and Electronic components ,Perform Electrical Wirings and Electronics Circuit , Design and Construct Simple Printed Circuit Board , Troubleshoot AC/DC Power Supply with Single-Phase Input, Construct & repair Electrical mitad and stove , Maintain and repair electric domestic appliance, Maintain & repair microwave oven ,Install & repair washing machine ,Install and Repair Multimedia equipment

in accordance with the performance criteria and evidence guide described in the OS.

1.2. TVET-Program Training Outcomes

The expected outputs of this program are the acquisition and implementation of the following units of competences:

EISEEES2 01 0322 Perform electrical/Electronic Measurement and Calculation

EISEEES2 02 0322 Test Electrical and Electronic components

EISEEES2 03 0322 Perform Electrical Wirings and Electronics Circuit

EISEEES2 04 0322 Design and Construct Simple Printed Circuit Board

EIS EEES2 05 0322 Troubleshoot AC/DC Power Supply with Single-Phase Input

EIS EEES2 06 0322 Construct & repair Electrical mitad and stove

EIS EEES2 07 0322 Maintain and repair electric domestic appliance

EIS EEES2 08 0322 Maintain & repair microwave oven

EIS EEES2 09 0322 Install & repair washing machine

EISEEES2 10 0322 Install and Repair Multimedia equipment

EISEEES2 11 0322 Apply 5S Procedures

1.3. Duration of the TVET-Program

The Program will have duration of **920-hours** including the on school/ Institution training and on-the-job practice or cooperative training time. Such cooperative training based on realities of the industry, nature of the occupation, location of the TVET institution, and other factors will be considered in the training delivery to ensure that trainees acquire practical and workplace experience.

No	Unit competency	TVET Institution training		Cooperative training	Total hours	Remark
		Theory	Practical			
1.	Apply 5S Procedures	9	12	9	**30**	
2.	Perform electrical/Electronic Measurement and Calculation	27	36	27	**90**	
3.	Test Electrical and Electronic component	21	42	21	**70**	
4.	Perform Electrical Wirings and Electronics Circuit	36	48	36	**120**	
5.	Design and Construct Simple Printed Circuit Board	36	48	36	**120**	
6.	Troubleshoot AC/DC Power Supply with Single-Phase Input	18	24	18	**60**	
7.	Construct & repair Electrical mitad and stove	24	48	24	**80**	
8.	Maintain and repair electric domestic appliance	24	48	24	**80**	
9.	Maintain & repair microwave oven	15	20	15	**60**	
10.	Install & repair washing machine	18	24	18	**60**	
11.	Install and Repair Multimedia equipment	45	90	45	**150**	
	Total hours	**273hrs**	**440hrs**	**273hus**	**920hrs**	

1.4. Qualification Level and Certification

Based on the descriptors elaborated on the Ethiopian National TVET Qualification Framework (NTQF) the qualification of this specific TVET Program is Level V**.**

The trainee can exit after successfully completing the modules in one level and will be awarded the equivalent institutional certificate on the level completed. However, only institutional certificate of training accomplishment will be awarded.

1.5. Target Groups

Any citizen **with or without disability** who meets the entry requirements under items 1.7 and capable of participating in the training activities is entitled to take part in the Program.

1.7 Entry Requirements

The prospective participants of this program are required to possess the requirements or directive of the **Ministry of Labor and Skills**.

1.8 Mode of Delivery

This TVET-Program is characterized as a formal Program on middle level technical skills. The mode of delivery is co-operative training. The time spent by the trainees in the real work place/ industry will give them enough exposure to the actual world of work and enable them to get hands-on experience.

The co-operative approach will be supported with school-based lecture-discussion, simulation and actual practice. These modalities will be utilized before the trainees are exposed to the industry environment.

Hence based on the nature of the occupation, location of the TVET institutions, and interest of the industry alternative mode of cooperative training such as apprenticeships, internship and traineeship will be employed. In addition, in the areas where industry is not sufficiently available the established production and service centers/learning factories in TVET institutions will be used as cooperative training places. The Training-Institution and identified companies have forged an agreement to co-operate with regard to the implementation of this program.

1.9. TVET-Program Structure

Unit of Competence		Module Code & Title		Training Outcomes	Duration (In Hours)
EISEEES2 11 0322	Apply 5S Procedures	EISEEES2 M01 0322	Applying 5S Procedures	• Prepare for work. • Sort items • Set all items in order. • Perform shine activities. • Standardize	30
EISEEES2 01 0322	Perform electrical/Electronic Measurement and Calculation	EISEEES2 M02 0322	Performing\electrical/Electronic Measurement and Calculation	• Plan and prepare tasks • Select measuring instruments • Carry out measurements and calculation • Maintain measuring instruments	90
EISEEES2 02 0322	Test Electrical and Electronic components	EISEEES2 M03 0322	Testing electrical and electronic components	• Plan and prepare to identify/test electrical/electronic parts • Identify and test Electrical/electronic components • Test the construction of electrical/ electronic circuits	70
EISEEES2 03 0322	Perform Electrical Wirings and	EISEEES2 M04 0322	Performing Electrical Wirings	• Plan and prepare for termination/ connection of electrical	120

	Electronics Circuit		and Electronics Circuit	wiring/electronics circuits • **I**dentify and interpret different kinds of electrical/electronic diagram • Terminate/ connect electrical wiring/electronic circuits • Test termination/ connections of electrical wiring/ electronics circuits.	
EISEEES2 04 0322	Design and Construct Simple Printed Circuit Board	EISEEES2 M05 0322	Designing and Constructing Simple Printed Circuit Board	• Plan and prepare to construct/ electrical/electronic circuits • Design and construct printed circuit board (PCB) • Construct electrical /electronic circuits on PCB • Test the construction of electrical/ electronic circuits	120
EISEEES2 05 0322	Troubleshoot AC/DC Power Supply with Single-Phase Input	EISEEES2 M06 0322	Troubleshooting AC/DC Power Supply with Single-Phase Input	• Prepare product and work station for troubleshooting • Diagnose faulty parts of power supply • Maintain/repair the power supply unit • Maintain/repair the power supply unit • Assemble low-power transformer	60

				• Test and inspect repaired products	
EISEEES2 06 0322	Construct & repair Electrical mitad and stove	EISEEES2 067 0322	Constructing & repairing Electrical mitad and stove	• producing Service manual • Constructing Mitad and stove • Testing and product • Complying completion procedures and documentations • Disposing Waste materials	80
EISEEES2 07 0322	Maintain and repair electric domestic appliance	EISEEES2 M08 0322	Maintaining and repairing electric domestic appliance	• Prepare unit, tools, equipment and workstation • Diagnose faults of the unit • Maintain/repair the unit • Test repaired unit	80
EISEEES2 08 0322	Maintain & repair microwave oven	EISEEES2 M09 0322	Maintaining & repair microwave oven	• Prepare unit, tools, equipment and workstation • Diagnose faults of the unit. • Maintain/repair the unit. • Test repaired unit	60
EISEEES2 09 0322	Install & repair washing machine	EISEEES2 M10 0322	Installing & repairing washing machine	• Prepare unit, tools, equipment and workstation • Diagnose faults of the unit	60

				• Maintain/repair the unit • Test repaired unit	
EISEEES2 10 0322	Install and Repair Multimedia equipment	EISEEES2 M11 0322	Installing and Repairing Multimedia equipment	• Prepare unit, tools and workstation • Diagnose faults • Install and repair product • Test repaired product	150
				Total Duration of hours	**920 Hours**

*The time duration (Hours) indicated for the module should include all activities in and out of the TVET institution.

1.10 Institutional Assessment

Two types of evaluation will be used in determining the extent to which training outcomes are achieved. The specific training outcomes are stated in the modules. In assessing them, verifiable and observable indicators and standards shall be used.

The ***formative assessment*** is incorporated in the training modules and form part of the training process. Formative evaluation provides the trainee with feedback regarding success or failure in attaining training outcomes. It identifies the specific training errors that need to be corrected, and provides reinforcement for successful performance as well. For the teacher, formative evaluation provides information for making instruction and remedial work more effective.

Summative Evaluation the other form of evaluation is given when all the modules in the program have been accomplished. It determines the extent to which competence have been achieved. And, the result of this assessment decision shall be expressed in the term of institutional Assessment implementation guidelines..

Techniques or tools for obtaining information about trainees' achievement include oral or written test, demonstration and on-site observation.

1.11 TVET Teachers Profile

The teachers conducting this particular TVET Program are **B level and above** who have satisfactory practical experiences or equivalent qualifications.

LEARNING MODULE 01
TVET-PROGRAMME TITLE: **Electrical/Electronic Equipment Servicing Level II**
MODULE TITLE: **Applying 5S Procedures**
MODULE CODE: **EISE EES2 M01` 0322**
NOMINAL DURATION:**30 hours**
MODULE DESCRIPTION :- This module covers the knowledge, skills and attitude required to apply 5S techniques to his/her workplace. It covers responsibility for the day-to-day operations of the workplace and ensuring that continuous improvements of Kaizen elements are initiated and institutionalized.
LEARNING OUTCOMES At the end of the module the trainee will be able to: **LO1. Prepare for work.** **LO2. Sort items** **LO3. Set all items in order.** **LO4. Perform shine activities.** **LO5. Standardize 5S.** **LO6. Sustain 5S**
MODULE CONTENTS: **LO1. Prepare for work.** 1.1. Work instructions 1.2. Job specifications 1.3. OHS requirements 1.4. Preparing Tools and equipment 1.5. Safety of equipment and tools. 1.6. Kaizen Board (Visual Management Board) **LO2. Sort items** 2.1. Identifying all items in the workplace 2.2. Listing Necessary and unnecessary items. 2.3. Using Red tag strategy for unnecessary items. 2.4. Remove Unnecessary items 2.5. Quantifying Necessary items 2.6. Reporting Performance results

2.7. Checking Necessary items regularly

LO3. Set all items in order.

3.1. Preparing Plan to implement set in order activities.
3.2. Performing General cleaning activities.
3.3. Deciding Location/Layout, storage and indication methods.
3.4. Tools for setting in order activities.
3.5. Placing items in their assigned locations.
3.6. Returning items after use.
3.7. Reporting Performance results.
3.8. Checking each item regularly in its assigned location and order.

LO4. Perform shine activities

4.1 Preparing Plan to implement shine activities.
4.2 Using necessary tools and equipment.
4.3 Implementing Shine activity.
4.4 Reporting Performance results.
4.5 Conducting regular shining activities.

LO5. Standardize 5S.

5.1. Preparing Plan to standardize 5S activities.
5.2. Tools and techniques to standardize 5S
5.3. Following Checklists.
5.4. Keeping the workplace to the specified standard.
5.5. Avoiding Problems by standardizing activities.

LO6. Sustain 5S

6.1. Preparing Plan to sustain 5S activities.
6.2. Discussing tools and techniques
6.3. Inspecting Workplace regularly
6.4. Cleaning work place after and before job
6.5. Situations where compliance to standards is unlikely
6.6. Recommending improvements.
6.7. Following Checklists.
6.8. Avoiding Problems by sustaining activities.

Annex: Resource Requirements

EISE EES2 M11 0322 :Applying 5S Procedures				
Item No.	**Category/Item**	**Description/ Specifications**	**Quantity**	**Recommended Ratio (Item: Trainee)**
A. Learning Materials				
1.	TTLM	prepared by the trainer	25	1:25
2.	Gemba	Kaizen 2nd edition	25	1:25
A. Learning Facilities & Infrastructure				
1	Library	10 x 12 meter	1rooms	1:25
2	Lecture Room	6 x 7 meter		
3	Work shop	10 x 8 meter		
B. Consumable Tools and Equipments				
1.	Paint	Colored	Pcs	1:1
2.	Hook	Standard	Pcs	1:1
3.	Sticker	Standard	Pcs	1:1
4.	Signboard	Medium sized	Pcs	1:1
5.	Nails	Small sized	Pcs	1:1
6.	Shelves	Wooden and metal made	Pcs	1:1
7.	Sponge	Medially cut	Pcs	1:1
8.	Broom	Used while standing	Pcs	1:1
9.	Tools board	To display kaizen board	Pcs	1:1
10.	White board	Portable	Pcs	1:1
11.	Projector	Normal	Pcs	1:1

Learning Methods:				
For none impaired trainees	**Reasonable Adjustment for Trainees with Disability (TWD)**			
	Low Vision	**Deaf**	**Hard of hearing**	**Physical impairment**
Lecturing	❖ Provide large print text ❖ Prepare the lecture in **Audio/video** ❖ Organize the class room seating arrangement to be accessible to trainees ❖ Write short notes on the black/white board using large text ❖ Make sure the luminosity of the light of class room is kept ❖ Use normal tone of voice ❖ Encourage trainees to record the lecture in audio format ❖ Provide Orientation on the physical feature of the work shop ❖ Summarize main points	❖ Assign sign language interpreter ❖ Arrange the class room seating to be conducive for eye to eye contact ❖ Make sure the luminosity of the light of class room is kept ❖ Introduce new and relevant vocabularies ❖ Use short and clear sentences ❖ Give emphasis on visual lecture and ensure the attention of the trainees ❖ Avoid movement during lecture time ❖ Present the lecture in video format ❖ Summarize main points	❖ Organize the class room seating arrangement to be accessible to trainees ❖ Speak loudly ❖ Ensure the attention of the trainees ❖ Present the lecture in video format ❖ Ensure the attention of the trainees	❖ Organize the class room seating arrangement to be accessible for wheelchairs users. ❖ Facilitate and support the trainees who have severe impairments on their upper limbs to take note ❖ Provide Orientation on the physical feature of the work shop

ASSESSMENT METHODS:				
Self assignment		❖ Use sign language interpreter ❖ Ensure or conform whether the proper communication was conducted with the trainee through the service of the sign language interpreter ❖ Use short and clear questioning ❖ Time extension	❖ Speak loudly ❖ Using sign language interpreter if necessary	❖ Use written response as an option for the trainees having speech challenges
Written test	❖ Prepare the exam in large texts ❖ Use interview as an option if necessary ❖ Prepare the exam in audio format ❖ Assign human reader ❖ (if necessary) ❖ Time extension	❖ Prepare the exam using short sentences, multiple choices, True or False, matching and short answers ❖ Avoid essay writing ❖ Time extension	❖ Prepare the exam using short sentences, multiple choices, true or false, matching and short answers if necessary.	❖ Use oral response as an option to give answer for trainees having severe upper limb impairment ❖ Time extension for trainees having severe upper limb impairment

ASSESSMENT CRITERIA:

LO1. Prepare for work.

- Work instructions are used to determine job requirements, including method, material and equipment.
- Job specifications are read and interpreted following working manual.
- OHS requirements, including dust and fume collection, breathing apparatus and eye and ear personal protection needs are observed throughout the work.
- Tools and equipment are prepared and used to implement 5S.
- Safety equipment and tools are identified and checked for safe and effective operation.
- Kaizen Board (Visual Management Board) is prepared and used in harmony with different workplace contexts.

LO2. Apply basic first aid techniques

- Plan is prepared to implement sorting activities.
- Cleaning activities are performed.
- All items in the workplace are identified following the appropriate procedures.
- Necessary and unnecessary items are listed using the appropriate format.
- Red tag strategy is used for unnecessary items.
- Unnecessary items are evaluated and placed in an appropriate place other than the workplace.
- Necessary items are recorded and quantified using appropriate format.
- Performance results are reported using appropriate formats.
- Necessary items are regularly checked in the workplace.

LO3. Communicate details of the incident

- Plan is prepared to implement set in order activities.
- General cleaning activities are performed.
- Location/Layout, storage and indication methods for items are decided.
- Necessary tools and equipment are prepared and used for setting in order activities.
- Items are placed in their assigned locations.
- After use, the items are immediately returned to their assigned locations.
- Performance results are reported using appropriate formats.
- Each item is regularly checked in its assigned location and order

LO4. Perform shine activities

- Plan is prepared to implement shine activities.
- Necessary tools and equipment are prepared and used for shinning activities.
- Shine activity is implemented using appropriate procedures.
- Performance results are reported using appropriate formats.
- Regular shining activities are conducted

LO5. Standardize 5S.

- Plan is prepared and used to standardize 5S activities.
- Tools and techniques to standardize 5S are prepared and implemented based on relevant procedures.
- Checklists are followed for standardize activities and reported to relevant personnel.
- The workplace is kept to the specified standard.
- Problems are avoided by standardizing activities.

LO6. Sustain 5S.

- Plan is prepared and followed to sustain 5S activities.
- Tools and techniques to sustain 5S are discussed, prepared and implemented based on relevant procedures.
- Workplace is inspected regularly for compliance to specified standard and sustainability of 5S techniques.
- Workplace is cleaned up after completion of job and before commencing next job or end of shift.
- Situations are identified where compliance to standards is unlikely and actions specified in procedures are taken.
- Improvements are recommended to lift the level of compliance in the workplace.
- Checklists are followed to sustain activities and report to relevant personnel.
- Problems are avoided by sustaining activities.

LEARNING MODULE 02
TVET-PROGRAMME TITLE: Electrical/Electronic Equipment Servicing Level II
MODULE TITLE: **Performing Electrical/Electronic Measurement and Calculation**
MODULE CODE: **EISEEES2 M02 0322**
NOMINAL DURATION: **90Hours**
MODULE DESCRIPTION: This module covers the competence required needed to identify, care, handle and use measuring instruments and apply basic electrical calculation.
LEARNING OUTCOMES At the end of the module the trainee will be able to: **LO1. Plan and prepare tasks** **LO2. Select measuring instruments** **LO3. Carry out measurements and calculation** **LO4. Maintain measuring instruments**
MODULE CONTENTS: **LO1. Plan and prepare tasks** **1.1.** Identifying component or object to be measured **1.2.** Obtaining correct specifications **1.3.** Selecting Measuring instruments with job requirements **1.4.** Making workstation ready with job specifications. **LO2. Select measuring instruments** 2.1 .Selecting suitable measuring instrument 2.2 Obtaining accurate measurements. 2.3 Performing four basic process of mathematical calculation 2.4 Performing mathematical calculations of parallel circuit, series circuit and series-parallel circuit. 2.5 Checking and correcting numerical computation 2.6 Reading the limitation of accuracy of instruments tool **LO3. Carry out measurements and calculation** 3.1. Handling measuring instruments without damage. 3.2. Cleaning before and after using measuring instruments. 3.3. Undertaking proper storage of instruments **LO4. Maintain measuring instruments**

4.1. Identifying object or component

4.2 Obtaining correct specifications

4.3 Selecting measuring tools

Learning Methods:				
For none impaired trainees	**Reasonable Adjustment for Trainees with Disability (TWD)**			
	Low Vision	**Deaf**	**Hard of hearing**	**Physical impairment**
Lecture-discussion	❖ Provide large print text ❖ Prepare the lecture in **Audio/video** ❖ Organize the class room seating arrangement to be accessible to trainees ❖ Write short notes on the black/white board using large text ❖ Make sure the luminosity of the light of class room is kept ❖ Use normal tone of voice ❖ Encourage trainees to record the lecture in audio format ❖ Provide Orientation on the physical feature of the work shop ❖ Summarize main points	❖ Assign sign language interpreter ❖ Arrange the class room seating to be conducive for eye to eye contact ❖ Make sure the luminosity of the light of class room is kept ❖ Introduce new and relevant vocabularies ❖ Use short and clear sentences ❖ Give emphasis on visual lecture and ensure the attention of the trainees ❖ Avoid movement during lecture time ❖ Present the lecture in video format ❖ Summarize main points	❖ Organize the class room seating arrangement to be accessible to trainees ❖ Speak loudly ❖ Ensure the attention of the trainees ❖ Present the lecture in video format ❖ Ensure the attention of the trainees	❖ Organize the class room seating arrangement to be accessible for wheelchairs users. ❖ Facilitate and support the trainees who have severe impairments on their upper limbs to take note ❖ Provide Orientation on the physical feature of the work shop

Demonstration	❖ Conduct close follow up ❖ Use verbal description ❖ Provide special attention in the process of guidance ❖ facilitate the support of peer trainees ❖ Prepare & use simulation	❖ use Sign language interpreter ❖ Use video recorded material ❖ Ensure attention of the trainees ❖ Provide structured training ❖ Show clear and short method ❖ Use gesture ❖ rovide tutorial support (if necessary)	❖ Illustrate in clear & short method ❖ Use Video recorded material ❖ Ensure the attention of the trainees ❖ rovide tutorial support (if necessary)	❖ Facilitate and support the trainees having severe upper limbs impairment to operate equipments/ machines ❖ Assign peer trainees to assist ❖ Conduct close follow up ❖ rovide tutorial support (if necessary
Group discussion	❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member ❖ Brief the thematic issues of the work	❖ Use sign language interpreters ❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member	❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member ❖ Inform the group	❖ Introduce the trainees with their peers

			members to speak loudly	
Exercise	❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process	❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process/practical training ❖ Introduce new and relevant vocabularies	❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process/ practical training	❖ Assign peer trainees ❖ Use additional nominal hours if necessary
Individual assignment	❖ prepare the assignment questions in large text ❖ Encourage the trainees to prepare and submit the assignment in large texts ❖ Make available recorded assignment questions ❖ Facilitate the trainees to prepare and submit the assignment in soft or hard copy	❖ Use sign language interpreter ❖ Provide briefing /orientation on the assignment ❖ Provide visual recorded material	❖ Provide briefing /orientation on the assignment ❖ Provide visual recorded material	

ASSESSMENT METHODS:				
Interview		❖ Use sign language interpreter ❖ Ensure or conform whether the proper communication was conducted with the trainee through the service of the sign language interpreter ❖ Use short and clear questioning ❖ Time extension	❖ Speak loudly ❖ Using sign language interpreter if necessary	❖ Use written response as an option for the trainees having speech challenges
Written test	❖ Prepare the exam in large texts ❖ Use interview as an option if necessary ❖ Prepare the exam in audio format ❖ Assign human reader ❖ (if necessary) ❖ Time extension	❖ Prepare the exam using short sentences, multiple choices, True or False, matching and short answers ❖ Avoid essay writing ❖ Time extension	❖ Prepare the exam using short sentences, multiple choices, true or false, matching and short answers if necessary.	❖ Use oral response as an option to give answer for trainees having severe upper limb impairment ❖ Time extension for trainees having severe upper limb impairment

ASSESSMENT CRITERIA:

LO.1 Plan and prepare tasks

- Object or component to be measured is identified according to procedures
- Correct specifications are obtained from relevant source
- Measuring instruments are selected in line with job requirements
- Workstation is made ready in accordance with job specification

LO.2 Select measuring instruments

- Appropriate measuring instrument is selected to achieve required outcome
- Accurate measurements are obtained for job
- Calculation needed to complete work tasks are performed using the four basic process of addition (+), subtraction (-), multiplication (x), and division (/)
- Calculation involving fractions, percentages and mixed numbers are used to complete workplace tasks.
- Numerical computation is checked and corrected for accuracy
- Instruments are read to the limit of accuracy of the tool.

LO.3 Carry out measurements and calculation

- Measuring instruments are handles without damage according to procedures
- Measuring instruments are cleaned before and after using.
- Proper storage of instruments is undertaken according to manufacturer's specifications and standard operating procedures.

LO.4 Maintain measuring instruments

- Object or component to be measured is identified according to procedures
- Correct specifications are obtained from relevant source
- Measuring tools are selected in line with job requirements

EISEEES2 M02 0322 : Performing Electrical/Electronic Measurement and Calculation				
Item No.	**Category/Item**	**Description/ Specifications**	**Quantity**	**Recommended Ratio (Item: Trainee)**
A.	**Learning Materials**			
1.	TTLM	By Trainers	25pcs	1:1
2.	Basic Electronics Devices , Circuits and it Fundamentals	Santiram KA	25pcs	1:1
B.	**Learning Facilities & Infrastructure**			
1.	Library	10 x 12 meter	1room	1:25
2.	Lecture Room	6 x 7 meter		
3.	Work shop	10 x 8 meter		
C.	***Consumable Materials***			
1.	Drawing Papers	White plane paper with size of A4,A3,A1&A2	pcs	1:1
2.	Pencils	Wooden pencil and mechanical pencil	pcs	1:1
3.	Sharper	Standard	pcs	1:1
4.	Eraser	Gum type eraser	pcs	1:1
D.	***Tools and Equipments***			
1.	Straight edge	Plastic type	pcs	1:1
2	Torque gauge	Plastic type	pcs	1:1
3	T- square	Plastic type	pcs	1:1
4	Protractor	Plastic type	pcs	1:1
5	Combination gauge	Plastic type	pcs	1:1
6	Steel rule	Plastic type	pcs	1:1
7	Analog /digital voltmeter	220V AC -750v AC	pcs	1:1
9	Analog /digital Multi-meter	220V AC-750v AC	pcs	1:1

10	Watt meter	230W/400W	pcs	1:1
11	Energy meter	25A	pcs	1:1
12	Analog /digital voltmeter	220V AC -750v AC	pcs	1:1
13	Tachometer	1500/1800RPM	pcs	1:1
14	Frequency counter	50HZ/60HZ	pcs	1:1
15	Clamp meter	10A-50A	pcs	1:1
16	Analogue/digital Oscilloscope	5sec-10v /time division	pcs	1:1
17	Function/signal generator		pcs	1:1
18	RLC meter	100 Hz, 120 Hz, 1 kHz, 10 kHz, and 100 kHz	pcs	1:1
19	Micrometer	1 µm and 10 µm , 10 µm and 100 µm	pcs	1:1
20	Varner caliper		pcs	1:1

LEARNING MODULE 03
TVET-PROGRAMME TITLE: Electrical/Electronic Equipment Servicing II
MODULE TITLE: Testing Electrical and Electronic components
MODULE CODE: EISEEES2 M03 0322
NOMINAL DURATION : 70 Hours
MODULE DESCRIPTION: This module covers the knowledge, skills and attitudes needed to identify and testing of electrical & electronics components
LEARNING OUTCOMES At the end of the module the trainee will be able to: **LO1. Plan and prepare to identify/test electrical/electronic parts** **LO2.Identify and test Electrical/electronic components** **LO3.Test the construction of electrical/ electronic circuits**
MODULE CONTENTS: **LO1. Plan and prepare to identify/test electrical/electronic parts** 1.1 Applying OHS and safety guideline 1.2 Selecting Appropriate tools and test instrument 1.3 Checking specifications and tasks of materials 1.4 Preparing Electrical/electronics components 1.4.1. Passive components (capacitor, resistor, inductor, etc) 1.4.2. Active components (transistor, diode, thyristors, etc **LO2. Identify and test Electrical/electronic components** 2.1 Observing hand tools/test instrument 2.2 Undertaking Work safely with the workplace 2.3 Identifying Electrical/Electronic Components/parts 2.3.1 Passive components & active components 2.4 Testing electrical /electronic circuits & parts 2.4.1. Power supply circuit, Rectifier circuit and Amplifier circuit 2.5. Following correct use of test/measuring instrument 2.6. Reading and interpreting specification of electronic component **LO3.Test the construction of electrical/ electronic circuits**

3.1 Assembling electrical/electronic circuit

3.2 Checking operation of the circuits

3.3 Testing the completed electrical/electronic circuits.

3.4 Constructing basic electrical/electronic circuit

3.5 Responding unplanned events

Learning Methods:				
For none impaired trainees	**Reasonable Adjustment for Trainees with Disability (TWD)**			
	Low Vision	**Deaf**	**Hard of hearing**	**Physical impairment**
Lecture-discussion	❖ Provide large print text ❖ Prepare the lecture in **Audio/video** ❖ Organize the class room seating arrangement to be accessible to trainees ❖ Write short notes on the black/white board using large text ❖ Make sure the luminosity of the light of class room is kept ❖ Use normal tone of voice ❖ Encourage trainees to record the lecture in audio format ❖ Provide Orientation on the physical feature of the work shop ❖ Summarize main points	❖ Assign sign language interpreter ❖ Arrange the class room seating to be conducive for eye to eye contact ❖ Make sure the luminosity of the light of class room is kept ❖ Introduce new and relevant vocabularies ❖ Use short and clear sentences ❖ Give emphasis on visual lecture and ensure the attention of the trainees ❖ Avoid movement during lecture time ❖ Present the lecture in video format ❖ Summarize main points	❖ Organize the class room seating arrangement to be accessible to trainees ❖ Speak loudly ❖ Ensure the attention of the trainees ❖ Present the lecture in video format ❖ Ensure the attention of the trainees	❖ Organize the class room seating arrangement to be accessible for wheelchairs users. ❖ Facilitate and support the trainees who have severe impairments on their upper limbs to take note ❖ Provide Orientation on the physical feature of the work shop

Demonstration	❖ Conduct close follow up ❖ Use verbal description ❖ Provide special attention in the process of guidance ❖ facilitate the support of peer trainees ❖ Prepare & use simulation	❖ use Sign language interpreter ❖ Use video recorded material ❖ Ensure attention of the trainees ❖ Provide structured training ❖ Show clear and short method ❖ Use gesture ❖ rovide tutorial support (if necessary)	❖ Illustrate in clear & short method ❖ Use Video recorded material ❖ Ensure the attention of the trainees ❖ rovide tutorial support (if necessary)	❖ Facilitate and support the trainees having severe upper limbs impairment to operate equipments/ machines ❖ Assign peer trainees to assist ❖ Conduct close follow up ❖ rovide tutorial support (if necessary
Group discussion	❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member ❖ Brief the thematic issues of the work	❖ Use sign language interpreters ❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member	❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member ❖ Inform the group	❖ Introduce the trainees with their peers

			members to speak loudly	
Exercise	❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process	❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process/practical training ❖ Introduce new and relevant vocabularies	❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process/ practical training	❖ Assign peer trainees ❖ Use additional nominal hours if necessary
Individual assignment	❖ prepare the assignment questions in large text ❖ Encourage the trainees to prepare and submit the assignment in large texts ❖ Make available recorded assignment questions ❖ Facilitate the trainees to prepare and submit the assignment in soft or hard copy	❖ Use sign language interpreter ❖ Provide briefing /orientation on the assignment ❖ Provide visual recorded material	❖ Provide briefing /orientation on the assignment ❖ Provide visual recorded material	

ASSESSMENT METHODS:				
Interview		❖ Use sign language interpreter ❖ Ensure or conform whether the proper communication was conducted with the trainee through the service of the sign language interpreter ❖ Use short and clear questioning ❖ Time extension	❖ Speak loudly ❖ Using sign language interpreter if necessary	❖ Use written response as an option for the trainees having speech challenges
Written test	❖ Prepare the exam in large texts ❖ Use interview as an option if necessary ❖ Prepare the exam in audio format ❖ Assign human reader ❖ (if necessary) ❖ Time extension	❖ Prepare the exam using short sentences, multiple choices, True or False, matching and short answers ❖ Avoid essay writing ❖ Time extension	❖ Prepare the exam using short sentences, multiple choices, true or false, matching and short answers if necessary.	❖ Use oral response as an option to give answer for trainees having severe upper limb impairment ❖ Time extension for trainees having severe upper limb impairment

ASSESSMENT CRITERIA:

LO.1 Plan and prepare to identify/test electrical/electronic parts

- Materials are checked according to specifications and tasks
- Appropriate tools and test instrument are selected according to task requirements
- Task is planned to ensure occupational health and safety (OHS) guidelines and procedures are followed
- Electrical/electronic components are identified correctly and prepared for testing, de-soldering/soldering of electronic components in accordance with instructions and work procedures

LO.2 Identify and test Electrical/electronic components

- Safety procedures in using hand tools/test instrument are observed at all times and appropriate personal protective equipment are used
- Work is undertaken safely in accordance with the workplace and standard procedures
- Important electrical/electronic components/parts are identified
- Appropriate range of methods in testing electrical /electronic circuits & parts (capacitor, diode, resistor, transistor, power supply and other electrical/electronic component) are used according to specifications, manufacturer's requirements and safety
- Correct use of test/measuring instrument is followed according to electrical/electronic components/parts function and specification
- Confirm the electrical/electronic components/parts data, function and value in accordance to parts/component specification
- Read and interpret the specification of electronic component using electronic catalogue guide (ECG)

LO.3 Test the construction of electrical/ electronic circuits

- Assembling electrical/electronic circuit in accordance with the given diagram.
- Testing of the completed construction of electrical/electronic circuits is conducted for compliance with specifications and regulations using appropriate procedures and equipment
- Check the accurate operation of the constructed circuit
- Unplanned events or conditions are responded to in accordance with established procedures

Annex: Resource Requirements

EIS EEES2 M03 0322 : Testing Electrical and Electronic components

Item No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
A.	***Learning Materials***			
1.	TTLM	By Trainers	25	1:1
2.	Basic Electronics Devices , Circuits and it Fundamentals	Santiram KA	25	1:1
B.	***Learning Facilities & Infrastructure***			
1	Library	10 x 12 meter	1rooms	1:25
2	Lecture Room	6 x 7 meter		1:25
3	Work shop	10 x 8 meter		1:25
C	**Consumable materials**			
1.	Pen & ink	Red, blue and black	25pcs	1:1
2.	Pencil	Erasable type	25pcs	1:1
3.	Drafting, graph paper	A1	25pcs	1:1
4.	Tracing paper	A4	25pcs	1:1
5.	Eraser	Erase pencil	25pcs	1:1
6.	Heating plate	1000 watts	25pcs	1:1
7.	Circuit breaker	220V/20A	25pcs	1:1
8	Soldering lead	1mm rosin flux	25 roll	1:1
9	Heating plate	500 watts	25pcs	1:1
D.	***Tools and Equipment***			
2	Blender, coffee maker	220V/50Hz 1.5 liter	25pcs	1:5
3	Toaster, waffle maker	220V/50Hz	25pcs	1:5

7	Step-down transformer	220v/12v	25pcs	1:1
8	Soldering iron/gun	220V/50Hz	25pcs	1:1
9	Screwdriver (assorted)	Philips type	25pcs	1:1
10	Screwdriver (assorted)	Hexagonal type	25pcs	1:1
11	Screwdriver (assorted)	Flat type	25pcs	1:1
15	Multi-testers (analog/digital)	Multi Function (Ampere,Voltageand Ohms)	25pcs	1:1
16	Clamp meter	Multi Function (Ampere,Voltageand Ohms)	25pcs	1:5
17	Utility knife	5 pcs replaceable blade	25pcs	1:1
18	Wire stripper	150mm length .3-4.5mm ø	25pcs	1:1
19	Pliers (assorted)	130mm-155mm length	25pcs	1:1
20	Work bench	Length 2m, height 80 cm, Width 1.2	5pcs	**1:5**
21	Test light	Lamp indicator	25pcs	1:1
22	Cleaning brush	Outside cleaning of copper, steel, brass, aluminum tubes	25pcs	1:1
23	Ball peen hammer	300gms-500gms	25pcs	1:1
24	Electric cable	3wire in one $2.5mm^2$ ø	5 roll	1:5
25	Electric wires	2. $5mm^2$ ø	5 roll	1:5
28	Glue Gun/Stick	Standard	25pcs	1:1
29	Glue gun	standard	5pcs	1:5
30	Multi-testers (analog/digital)	Multi Function (Ampere,Voltageand Ohms)	5pcs	1:5
31	Clamp meter	Multi Function (Ampere,Voltageand Ohms)	5pcs	1:5
32	Utility knife	Replaceable blade	5pcs	1:5

LEARNING MODULE 04
TVET-PROGRAMME TITLE: **Electrical/Electronic Equipment Servicing II**
MODULE TITLE: **Performing Electrical Wirings and Electronics Circuit**
MODULE CODE: **EIS EEES2 M04 0322**
NOMINAL DURATION : **120 Hours**
MODULE DESCRIPTION: This module covers the knowledge, skills and attitudes needed to terminate and connect electrical wirings and electronic circuits.
LEARNING OUTCOMES At the end of the module the trainee will be able to: **LO1. Plan and prepare for termination/ connection of electrical wiring/electronics circuits** **LO2. Identify and interpret different kinds of electrical/electronic diagram** **LO3. Terminate/ connect electrical wiring/electronic circuits** **LO4.Test termination/ connections of electrical wiring/ electronics circuits.**
MODULE CONTENTS: **LO1 Plan and prepare for termination/ connection of electrical wiring/electronics circuits** 1.1. Following OH & S guidelines and procedures 1.2. Selecting appropriate tools and equipment 1.3. Checking materials 1.4. Preparing electrical wiring/electronic circuits for connecting/termination **LO2. Identify and interpret different kinds of electrical/electronic diagram** 2.1 Selecting correct electrical/electronic diagram 2.2 Identifying and interpreting electrical Symbols 2.3 Selecting correct electrical/electronic diagram 2.4 Segregating electrical/electronic diagrams by types and kinds. 2.5 Checking and validating circuit diagrams standard operating procedures 2.6 Drawing and identifying electrical/electronic schematic **LO3. Terminate/ connect electrical wiring/electronic circuits** 3.1. Observing Safety procedures 3.2. Using methods of termination and connection 3.3. Following correct sequence of operation

3.4. Undertaking confirmation of termination/connection

LO4. Test termination/ connections of electrical wiring/ electronics circuits

4.1 Conducting testing electric wiring termination and electronic circuits

4.2 Responding Unplanned events or conditions

Learning Methods:				
For none impaired trainees	**Reasonable Adjustment for Trainees with Disability (TWD)**			
	Low Vision	**Deaf**	**Hard of hearing**	**Physical impairment**
Lecture-discussion	❖ Provide large print text ❖ Prepare the lecture in **Audio/video** ❖ Organize the class room seating arrangement to be accessible to trainees ❖ Write short notes on the black/white board using large text ❖ Make sure the luminosity of the light of class room is kept ❖ Use normal tone of voice ❖ Encourage trainees to record the lecture in audio format ❖ Provide Orientation on the physical feature of the work shop ❖ Summarize main points	❖ Assign sign language interpreter ❖ Arrange the class room seating to be conducive for eye to eye contact ❖ Make sure the luminosity of the light of class room is kept ❖ Introduce new and relevant vocabularies ❖ Use short and clear sentences ❖ Give emphasis on visual lecture and ensure the attention of the trainees ❖ Avoid movement during lecture time ❖ Present the lecture in video format ❖ Summarize main points	❖ Organize the class room seating arrangement to be accessible to trainees ❖ Speak loudly ❖ Ensure the attention of the trainees ❖ Present the lecture in video format ❖ Ensure the attention of the trainees	❖ Organize the class room seating arrangement to be accessible for wheelchairs users. ❖ Facilitate and support the trainees who have severe impairments on their upper limbs to take note ❖ Provide Orientation on the physical feature of the work shop

Demonstration	❖ Conduct close follow up ❖ Use verbal description ❖ Provide special attention in the process of guidance ❖ facilitate the support of peer trainees ❖ Prepare & use simulation	❖ use Sign language interpreter ❖ Use video recorded material ❖ Ensure attention of the trainees ❖ Provide structured training ❖ Show clear and short method ❖ Use gesture ❖ rovide tutorial support (if necessary)	❖ Illustrate in clear & short method ❖ Use Video recorded material ❖ Ensure the attention of the trainees ❖ rovide tutorial support (if necessary)	❖ Facilitate and support the trainees having severe upper limbs impairment to operate equipments/ machines ❖ Assign peer trainees to assist ❖ Conduct close follow up ❖ rovide tutorial support (if necessary
Group discussion	❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member ❖ Brief the thematic issues of the work	❖ Use sign language interpreters ❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member	❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member ❖ Inform the group	❖ Introduce the trainees with their peers

			members to speak loudly	
Exercise	❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process	❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process/practical training ❖ Introduce new and relevant vocabularies	❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process/ practical training	❖ Assign peer trainees ❖ Use additional nominal hours if necessary
Individual assignment	❖ prepare the assignment questions in large text ❖ Encourage the trainees to prepare and submit the assignment in large texts ❖ Make available recorded assignment questions ❖ Facilitate the trainees to prepare and submit the assignment in soft or hard copy	❖ Use sign language interpreter ❖ Provide briefing /orientation on the assignment ❖ Provide visual recorded material	❖ Provide briefing /orientation on the assignment ❖ Provide visual recorded material	

ASSESSMENT METHODS:				
Interview		❖ Use sign language interpreter ❖ Ensure or conform whether the proper communication was conducted with the trainee through the service of the sign language interpreter ❖ Use short and clear questioning ❖ Time extension	❖ Speak loudly ❖ Using sign language interpreter if necessary	❖ Use written response as an option for the trainees having speech challenges
Written test	❖ Prepare the exam in large texts ❖ Use interview as an option if necessary ❖ Prepare the exam in audio format ❖ Assign human reader ❖ (if necessary) ❖ Time extension	❖ Prepare the exam using short sentences, multiple choices, True or False, matching and short answers ❖ Avoid essay writing ❖ Time extension	❖ Prepare the exam using short sentences, multiple choices, true or false, matching and short answers if necessary.	❖ Use oral response as an option to give answer for trainees having severe upper limb impairment ❖ Time extension for trainees having severe upper limb impairment
Demonstration/Observation	❖ Brief the instruction or provide them in large text ❖ Time extension	❖ Use sign language interpreter ❖ Brief on the instruction of the exam ❖ Provide activity-based/ practical assessment method ❖ Time extension	❖ Provide activity based assessment ❖ Brief on the instruction of the exam ❖ Use loud voice ❖ Time extension	❖ Provide activity based assessment ❖ Conduct close follow up ❖ Time extension

ASSESSMENT CRITERIA:

LO.1. Identify and interpret different kinds of electrical/electronic diagram

- Correct electrical/electronic diagram is selected according to job requirements
- electrical/electronic diagrams are segregated in accordance with the types and kinds of diagrams Components, assemblies are recognized as required
- Dimensions of the key features of the objects depicted in the diagrams are correctly identified
- Electrical Symbols used in the diagrams are identified and interpreted correctly
- diagrams is checked and validated against job requirements or equipment in accordance with standard operating procedures
- Electrical/electronic schematic is drawn and correctly identified
- Correct diagrams is identified, equipment are selected and used in accordance with job requirements

LO.2. Plan and prepare for termination/ connection of electrical wiring/electronics circuits

- Materials are checked according to specifications and tasks
- Appropriate tools and equipment are selected according to tasks requirements
- Task is planned to ensure OH & S guidelines and procedures are followed
- Electrical wiring/electronic circuits are correctly prepared for connecting/termination in accordance with instructions and work site procedures

LO.3. Terminate/ connect electrical wiring/electronic circuits

- Safety procedures in using tools are observed at all times and appropriate personal protective equipment are used
- Work is undertaken safely in accordance with the workplace and standard procedures
- Appropriate range of methods in termination/connection are used according to specifications, manufacturer's requirements and safety
- Correct sequence of operation is followed according to job specifications
- Accessories used are adjusted, if necessary
- Confirm termination/connection undertaken successfully in accordance with job specification

LO.4. Test termination/ connections of electrical wiring/ electronics circuits

- Testing of all completed termination/ connections of electric wiring/electronic circuits is conducted for compliance with specifications and regulations using appropriate procedures and equipment
- Wiring and circuits are checked using specified testing procedures
- Unplanned events or conditions are responded to in accordance with established procedure

Annex: Resource Requirements

Module code and title:- **EISEEES2 M04 0322** : **Perform Electrical Wirings and Electronics Circuit**				
Item No.	**Category/Item**	**Description/ Specifications**	**Quantity**	**Recommended Ratio (Item: Trainee)**
A.	**Learning Materials**			
1.	TTLM	By Trainers	25	1:1
2.	Basic Electronics Devices , Circuits and it Fundamentals	Santiram KA	25	1:1
3.	Electronic Principle	Author Malivino	25	1:1
4.	Instrumentation and measurements for Electronic Technicians	Author Robert b GILLIES	25	1:1
B.	***Learning Facilities & Infrastructure***			
1.	Library	10 x 12 meter	1 rooms	1:25
2.	Lecture Room	6 x 7 meter		1:25
3.	Work shop	10 x 8 meter		1:25
4.	Lift	Standard for 25 trainees	1 pcs	1:25
5.	work bench	Length 2m, height 80 cm, Width 1.2	5 Pcs	1:5
C.	***Consumable Materials***			
1.	Soldering lead	1mm Rosin flux	25 Pcs	1:1
2	Cables	Three wire in one $4mm^2$	25 Pcs	1:1
3	Cables	Three wire in one $2mm^2$	25 Pcs	1:1
5	Wires	$2.5mm^2$	25 Pcs	1:1
6	Wires	$1.5mm^2$	25 Pcs	1:1
6	Insulating tape	Electrical	25 Pcs	1:1
8	Flux	Electrical (100ml)	25 Pcs	1:1
9	Terminal lug(wire shoe)	Electrical	25 Pcs	1:1
10	Cable connector	Electrical	25 Pcs	1:1
11	Electronic work bench	Latest version of work bench	25 Pcs	1:1

	software			
12	Different electronic component	(passive and active components)	25 Pcs	1:1
13	Printed circuit board (PCB)	Solid type (30cmX20cm)	25 Pcs	1:1
14	Printed circuit board (PCB)	hole type and line connected (30cmX20cm)	25 Pcs	1:1
15	Printed circuit board (PCB)	Individual Hole type (30cmX20cm)	25 Pcs	1:1
16.	Screws	#4 wooden type	100 Pcs	4:1
17.	Screws	#6 wooden type	100 Pcs	4:1
18	Screws	#8 wooden type	100 Pcs	4:1
19	Screws	#10 wooden type	100 Pcs	4:1
20	Screws	#4 metal type	100 Pcs	4:1
21	Screws	#6 metal type	100 Pcs	4:1
22	Screws	#8 metal type	100 Pcs	4:1
23	Screws	#10 metal type	100 Pcs	4:1
24.	Switches	Single pole single throw/10A	25 Pcs	1:1
25.	Switches	Double pole single throw/10A	25 Pcs	1:1
26.	Switches	Double pole double throw/10A	25 Pcs	1:1
27.	Switches	Intermediate Switch/10A	25 Pcs	1:1
28.	Switches	Two way Switch/10A	25 Pcs	1:1
29	Cable connector	10A	25 Pcs	1:1
30	Cable connector	16A	25 Pcs	1:1
31	Cable connector	20A	25 Pcs	1:1
32	Cable connector	30A	25 Pcs	1:1
33	Circuit breaker	16A	25 Pcs	1:1
34	Circuit breaker	20A	25 Pcs	1:1
35	Circuit breaker	25A	25 Pcs	1:1
36	Circuit breaker	32A	25 Pcs	1:1
37	Kalki switch	25A	25 Pcs	1:1
38	Lamp holder	220V/10A	25 Pcs	1:1
39	Lamp	220V/40W	25 Pcs	1:1
40	Plug	220V/16A	25 Pcs	1:1

41	Plug	220V/32A	25 Pcs	1:1
41	Socket	220V/16A	25 Pcs	1:1
42	Socket	220V/32A	25 Pcs	1:1
43	A4 paper	80 gram	25 ream	1:1
D.	***Tools and Equipments***			
1.	Soldering iron/gun	40-60 Watts	25 Pcs	1:1
2	Screwdriver (assorted)	Philips type	25 Pcs	1:1
3	Screwdriver (assorted)	Hexagonal type	25 Pcs	1:1
4	Screwdriver (assorted)	Flat type	25 Pcs	1:1
5	Nut drivers (assorted)	Standard	25 Pcs	1:1
6	Wrenches (assorted)	Standard	25 Pcs	1:1
7	Allen wrench/key	Standard	25 Pcs	1:1
8	Multi-testers (analog/digital)	Multi Function (Ampere, Voltage and Ohms)	5 Pcs	1:5
9	Clamp meter	Multi Function (Ampere, Voltage and Ohms)	5 Pcs	1:5
10	Utility knife	5 pcs replaceable blade	5 Pcs	1:5
11	Wire stripper	150mm length .3-4.5mm	5 Pcs	1:5
12	Pliers (assorted)	130mm-155mm length	5 Pcs	1:5
13	Work bench	Length 2m, height 80 cm, Width 1.2	5 Pcs	1:5
14	Flashlight and test light	Lamp indicator	5 Pcs	1:5
15	Cleaning brush	Outside cleaning of copper, steel, brass, aluminum tubes	5 Pcs	1:5
16	Ball peen hammer	300gms-500gms	5 Pcs	1:5
17	Scriber	For boring stove	5 Pcs	1:5

LEARNING MODULE 04
TVET-PROGRAMME TITLE: **Electrical/Electronic Equipment Servicing Level II**
MODULE TITLE: **Designing and Constructing Simple Printed Circuit Board**
MODULE CODE: **EISE EES2 M05 0322**
NOMINAL DURATION: **120 Hours**
MODULE DESCRIPTION: This module covers the knowledge, skills and attitudes needed to design and construct basic consumer electrical/electronics circuits and prepare printed circuit board (PCB)
LEARNING OUTCOMES At the end of the module the trainee will be able to: **LO1. Plan and prepare to construct/ electrical/electronic circuits** **LO2. Design and construct printed circuit board (PCB)** **LO3. Construct electrical /electronic circuits on PCB** **LO4. Test the construction of electrical/ electronic circuits**
MODULE CONTENTS: **LO1: Plan and prepare to construct/ electrical/electronic circuits** 1.1 Planning task to ensure occupational health and safety 1.2 Checking the material 1.3 Selecting appropriate tools and equipment's 1.4 Preparing electrical/electronic circuits correctly for connecting and soldering **LO2. Design and construct printed circuit board (PCB)** 2.1 Observing safety procedures in using hand tools/equipment's and PPE 2.2 Checking the material 2.3 Undertaking work safely with in standard procedures 2.4 Identifying important electrical/electronic components 2.4.1 Passive components and active components 2.5 Applying proper etching procedure. 2.6. Preparing holes for electronic components. **LO3. Construct electrical /electronic circuits on PCB** 3.1. Observing safety procedures in using hand tools/equipment's and PPE 3.2. Undertaking work safely 3.3. Following correct sequence of operation. 3.3.1. Constructing linear power supply circuit 3.4. Adjusting necessary accessories used

3.5. Undertaking confirmation of construction successfully

LO4: Test the construction of electrical/ electronic circuits

4.1 Conducting test

4.2 Checking the accurate operation of the constructed circuit.

4.3 Responding unplanned events or conditions.

Disability Inclusive Learning Modules			
LEARNING METHODS:			
For None Impaired Trainees	**Reasonable Adjustment for Trainees with Disability (TWD)**		
	Deaf	**Hard of hearing**	**Physical impairment**
Lecture-discussion	❖ Assign sign language interpreter ❖ Arrange the class room seating to be conducive for eye to eye contact ❖ Make sure the luminosity of the light of class room is kept ❖ Introduce new and relevant vocabularies ❖ Use short and clear sentences ❖ Give emphasis on visual lecture and ensure the attention of the trainees ❖ Avoid movement during lecture time ❖ Present the lecture in video format ❖ Summarize main points	❖ Organize the class room seating arrangement to be accessible to trainees ❖ Speak loudly ❖ Ensure the attention of the trainees ❖ Present the lecture in video format ❖ Ensure the attention of the trainees	❖ Organize the class room seating arrangement to be accessible for wheelchairs users. ❖ Facilitate and support the trainees who have severe impairments on their upper limbs to take note ❖ Provide Orientation on the physical feature of the work shop
Demonstration	❖ use Sign language interpreter ❖ Use video recorded material ❖ Ensure attention of the trainees ❖ Provide structured training	❖ Illustrate in clear & short method ❖ Use Video recorded material ❖ Ensure the attention of the	❖ Facilitate and support the trainees having severe upper limbs impairment to operate equipments/ machines ❖ Assign peer trainees to assist

	❖ Show clear and short method ❖ Use gesture ❖ provide tutorial support (if necessary)	trainees ❖ provide tutorial support (if necessary)	❖ Conduct close follow up ❖ Provide tutorial support (if necessary
Group discussion	❖ Use sign language interpreters ❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member	❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member ❖ Inform the group members to speak loudly	❖ Introduce the trainees with their peers
Exercise	❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process/practical training ❖ Introduce new and relevant vocabularies	❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process/ practical training	❖ Assign peer trainees ❖ Use additional nominal hours if necessary
Individual assignment	❖ use sign language interpreter ❖ provide briefing /orientation on the assignment ❖ provide visual recorded material	Provide briefing /orientation on the assignment Provide visual recorded material	

Interview	❖ Use sign language interpreter ❖ Ensure or conform whether the proper communication was conducted with the trainee through the service of the sign language interpreter ❖ Use short and clear questioning ❖ Time extension	❖ Speak loudly ❖ Using sign language interpreter if necessary	❖ Use written response as an option for the trainees having speech challenges
Written test	❖ Prepare the exam using short sentences, multiple choices, True or False, matching and short answers ❖ Avoid essay writing ❖ Time extension	❖ Prepare the exam using short sentences, multiple choices, True or False, matching and short answers if necessary	❖ Use oral response as an option to give answer for trainees having severe upper limb impairment ❖ Time extension for trainees having severe upper limb impairment
Demonstration/Observation	❖ Use sign language interpreter ❖ Brief on the instruction of the exam ❖ Provide activity-based/ practical assessment method ❖ Time extension	❖ Provide activity based assessment ❖ Brief on the instruction of the exam ❖ Use loud voice ❖ Time extension	❖ Provide activity based assessment ❖ Conduct close follow up ❖ Time extension

ASSESSMENT METHODS:				
Interview		❖ Use sign language interpreter ❖ Ensure or conform whether the proper communication was conducted with the trainee through the service of the sign language interpreter ❖ Use short and clear questioning ❖ Time extension	❖ Speak loudly ❖ Using sign language interpreter if necessary	❖ Use written response as an option for the trainees having speech challenges
Written test	❖ Prepare the exam in large texts ❖ Use interview as an option if necessary ❖ Prepare the exam in audio format ❖ Assign human reader ❖ (if necessary) ❖ Time extension	❖ Prepare the exam using short sentences, multiple choices, True or False, matching and short answers ❖ Avoid essay writing ❖ Time extension	❖ Prepare the exam using short sentences, multiple choices, true or false, matching and short answers if necessary.	❖ Use oral response as an option to give answer for trainees having severe upper limb impairment ❖ Time extension for trainees having severe

				upper limb impairment
Demonstration /Observation	❖ Brief the instruction or provide them in large text ❖ Time extension	❖ Use sign language interpreter ❖ Brief on the instruction of the exam ❖ Provide activity-based/ practical assessment method ❖ Time extension	❖ Provide activity based assessment ❖ Brief on the instruction of the exam ❖ Use loud voice ❖ Time extension	❖ Provide activity based assessment ❖ Conduct close follow up ❖ Time extension

ASSESMENT CRITERIA:

LO1. Planning and preparing to construct/ electrical/electronic circuits

- Materials are checked according to specifications and tasks
- Appropriate tools and equipment's are selected according to task requirements
- Task is planned to ensure occupational health and safety (OHS) guidelines and procedures are followed
- Electrical/electronic circuits are correctly prepared for connecting and soldering in accordance with instructions and work site procedures

LO2. Design and construct printed circuit board (PCB)

- Materials are checked according to specifications and tasks
- Appropriate tools and equipment's are selected according to task requirements
- Safety procedures in using hand tools/equipment's are observed at all times and appropriate personal protective equipment are used
- Work is undertaken safely in accordance with the workplace and standard procedures
- Important electrical/electronic component dimension are identified
- proper etching procedure are applied
- Holes for electronic components are prepared according to the specification of task.

LO3: Construct electrical /electronic circuits on PCB

- Safety procedures in using hand tools/equipment's are observed at all times and appropriate personal protective equipment are used
- Work is undertaken safely in accordance with the workplace and standard procedures
- Important electrical/electronic components are identified
- Appropriate range of methods in constructing electrical / electronic circuits are used according to specifications, manufacturer's requirements and safety
- Correct sequence of operation is followed according to job specifications
- Accessories used are adjusted, if necessary
- Confirm the construction undertaken successfully in accordance with job specification

LO4. Test the construction of electrical/ electronic circuits

- Testing of the completed construction of electrical/electronic circuits is conducted for compliance with specifications and regulations using appropriate procedures and equipment
- Check the accurate operation of the constructed circuit
- Unplanned events or conditions are responded to in accordance with established procedures

A11. Resource requirement

EISEEES2 05 0322: Designing and Constructing Simple Printed Circuit Board				
Item No	**Category /Item**	**Description Specification**	**Quality**	**Recommendation (Item, Training)**
A	***Learning Material***			
1	TTLM	By trainers	25	1 : 25
2	Electronic Devices & Circuits	Sanjeev Gupta	25	1 : 25
3	Basic Electronics Devices , Circuits and it Fundamentals	Santiram KA	25	1 : 25
B	***Learning Facility& Infrastructure***			
1	Library	10 x 12 meter	1room	1 : 25
2	Lecture Room	6 x 7 meter		
3	Work shop	10 x 8 meter		
C	***Consumable Material***			
1.	Soldering lead	40 by 60 tin lead/1.5mm/	5 roll	1 : 5
2.	Flux	Rosin SP-44	5pcs	1 : 5
3.	Cables	$1.5mm^2$,$1mm^2$	5 roll	1 : 5
4.	Ultrasonic Cleaner (serialize)	120 watt, 5L	5 pcs	1 : 5
5.	Brush	For cleaning (big, small) 0.1-0.5mm	5 pcs	1 : 5
6.	Drill bit	0.5mm	5 set	1 : 5
7	Paper	A4	25pcs	1 : 1
8	Wire	Different color& d/t size	5 roll	1 : 5
9	Paste Flux	Rosin SP-44	500gm	1 : 5
10	Soldering Paste	PCB clear	25pcs	1 : 1
11	Disordering Wire	Remove excess solder (size 1.5m)	5roll	1 : 5
D Tools & Equipment's				
1	Nose Cutter	Small /medium	5 pcs	1 : 5
2	Screwdriver kit	(T1,T2,T3,T4,T5,T6,Flate and plhipes)	5 pcs	1 : 5

3	Tweezers/for saves/	to hold small electronic components d/t type	5 pcs	1 : 5
4	Nose Cutter	for any small mobile (techno/itel/smadel)	5 pcs	1 : 5
5	Digital Multi-meter	AC/200M-750V/DC/200M-1000V	5 pcs	1 : 5
6	Digital Multi meter battery	Energizer type 9 volts	5 pcs	1 : 5
7	Ultrasonic Cleaner (serialize)	Standard	5 pcs	1 : 5
8	DC Power Supply	YH-30 D Output Voltage: 0 V to 15 V DC digital type	5 pcs	1 : 5
9	Magnifying Lamp	Magnified view 3x, 4x, 5x, 10x, 50x	5 pcs	1 : 5

LEARNING MODULE 06

TVET PROGRAM TITLE: **Electrical/Electronic Equipment Servicing Level - II**

MODULE TITLE: **Troubleshooting AC/DC power supply with single-phase input**

MODULE CODE: **EIS EEES2 M06 0322**

NOMINAL DURATION: **60 Hours**

MODULE DESCRIPTION: This module covers the knowledge, attitudes and skills required in Troubleshooting AC/DC power supply with single-phase input in electrical/electronic that includes transformer rewinding industry.

LEARNING OUTCOMES:

At the end of this module the trainer will be able to

LO1: Prepare product and work station for troubleshooting

LO2: Diagnose faulty parts of power supply

LO3: Maintain/repair the power supply unit

LO4: Maintain/repair the power supply unit

LO5: Assemble low-power transformer

LO6: Test and inspect repaired products

MODULE CONTENTS:

LO1: Prepare product and work station for troubleshooting

1.1. Preparing required materials tools and equipment's

1.2. Following OH&S policies and procedures

1.3. Consulting for effective and proper work coordination

LO2: Diagnose faulty parts of power supply

2.1. Following trouble shooting technique.

2.2. Using test instruments.

2.3. Identifying defects/fault parts.

2.4. Advising customers.

2.5. Documenting of diagnose results and testes.

LO3: Maintain/repair the power supply unit

3.1. Using personal protective equipment's (PPE)

3.2. Replacing defective parts/components

3.3. Soldering repaired or replaced parts/components.

3.4. Performing control settings/adjustments

3.5. Performing cleaning

LO4: Rewind low power transformer

4.1. Performing rewinding process

4.2. Checking the rewinding process

4.3. Using measuring instruments.

LO5: Assemble low-power transformer.

5.1. Performing assembling process with OH&S policies and procedures

5.2. Checking the process by establishing standards

5.3. Checking the assembled product with quality standards.

LO6: Test and inspect repaired products

6.1. Inspecting and testing the repaired products

6.2. Documenting work completion.

6.3. Applying 5S

6.4. Disposing waste materials

Learning Methods:				
For none mpaired rainees	**Reasonable Adjustment for Trainees with Disability (TWD)**			
	Low Vision	**Deaf**	**Hard of hearing**	**Physical impairment**
Lecture-discussion	❖ Provide large print text ❖ Prepare the lecture in **Audio/video** ❖ Organize the class room seating rrangement to be accessible to trainees ❖ Write short notes on the black/white board sing large text ❖ Make sure the luminosity of the light of lass room is kept ❖ Use normal tone of voice ❖ Encourage trainees to record the lecture in udio format ❖ Provide Orientation on the physical feature f the work shop ❖ Summarize main points	❖ Assign sign language nterpreter ❖ Arrange the class room eating to be conducive for eye to ye contact ❖ Make sure the luminosity f the light of class room is kept ❖ Introduce new and relevant ocabularies ❖ Use short and clear entences ❖ Give emphasis on visual ecture and ensure the attention of he trainees ❖ Avoid movement during ecture time ❖ Present the lecture in video ormat	❖ Organize the lass room seating rrangement to be ccessible to trainees ❖ Speak loudly ❖ Ensure the ttention of the trainees ❖ Present the ecture in video format ❖ Ensure the ttention of the trainees	❖ Organiz the class room eating rrangement to be ccessible for wheelchairs users. ❖ Facilitat and support the rainees who have evere mpairments on heir upper limbs o take note ❖ Provide Orientation on the hysical feature f the work shop

		❖ Summarize main points		
Demonstration	❖ Conduct close follow up ❖ Use verbal description ❖ Provide special attention in the process of guidance ❖ facilitate the support of peer trainees ❖ Prepare & use simulation ❖ Use video	❖ use Sign language interpreter ❖ Use video recorded material ❖ Ensure attention of the trainees ❖ Provide structured training ❖ Show clear and short method ❖ Use gesture ❖ Provide tutorial support (if necessary)	❖ Illustrate in clear & short method ❖ Use Video recorded material ❖ Ensure the attention of the trainees ❖ Provide tutorial support (if necessary)	❖ Facilitate and support the trainees having severe upper limbs impairment to operate equipments/ machines ❖ Assign peer trainees to assist ❖ Conduct close follow up ❖ Provide tutorial support (if necessary
Group discussion	❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group	❖ Use sign language interpreters ❖ Facilitate the integration of trainees with group members	❖ Facilitate the integration of trainees with group members ❖ Conduct close	❖ Introduce the trainees with their peers

	nember ❖ Brief the thematic issues of the work	❖ Conduct close follow up ❖ Introduce the trainees with ther group member	ollow up ❖ Introduce the rainees with other group nember ❖ Inform the group nembers to speak loudly	
Exercise	❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process	❖ Conduct close follow up nd guidance ❖ Provide tutorial support if ecessary ❖ provide special attention in he process/practical training ❖ Introduce new and relevant ocabularies	❖ Conduct close ollow up and guidance ❖ Provide tutorial upport if necessary ❖ provide special ttention in the process/ ractical training	❖ Assign eer trainees ❖ Use dditional ominal hours if ecessary
Individual assignment	❖ prepare the assignment questions in large ext ❖ Encourage the trainees to prepare and ubmit the assignment in large texts ❖ Make available recorded assignment uestions ❖ Facilitate the trainees to prepare and ubmit the assignment in soft or hard copy	❖ Use sign language nterpreter ❖ Provide briefing orientation on the assignment ❖ Provide visual recorded naterial	❖ Provide briefing orientation on the ssignment ❖ Provide visual ecorded material	

ASSESSMENT METHODS:				
Interview		❖ Use sign language interpreter ❖ Ensure or conform whether the proper communication was conducted with the trainee through the service of the sign language interpreter ❖ Use short and clear questioning ❖ Time extension	❖ Speak loudly ❖ Using sign language interpreter if necessary	❖ Use written response as an option for the trainees having speech challenges
Written test	❖ Prepare the exam in large texts ❖ Use interview as an option if necessary ❖ Prepare the exam in audio format ❖ Assign human reader ❖ (if necessary) ❖ Time extension	❖ Prepare the exam using short sentences, multiple choices, True or False, matching and short answers ❖ Avoid essay writing ❖ Time extension	❖ Prepare the exam using short sentences, multiple choices, true or false, matching and short answers if necessary.	❖ Use oral response as an option to give answer for trainees having severe upper limb impairment ❖ Time extension for trainees having severe

				upper limb impairment
Demonstration /Observation	❖ Brief the instruction or provide them in large text ❖ Time extension	❖ Use sign language interpreter ❖ Brief on the instruction of the exam ❖ Provide activity-based/ practical assessment method ❖ Time extension	❖ Provide activity based assessment ❖ Brief on the instruction of the exam ❖ Use loud voice ❖ Time extension	❖ Provide activity based assessment ❖ Conduct close follow up ❖ Time extension

ASSESSMENT CRITERIA:

LO1: Prepare product and work station for troubleshooting

- Troubleshooting workplace is prepared in accordance with OH&S policies and procedures
- Responsible person is consulted for effective and proper work coordination
- Required materials, tools and equipment are prepared and checked in accordance with established procedures
- Parts and materials needed to complete the work are prepared and obtained according to requirements

LO2: Diagnose faulty parts of power supply

- Troubleshooting procedures are followed in accordance with OH&S policies and procedures
- Test instruments required for the job are used to test the required parameters in accordance with the manufacturer' data and safety procedures
- Defects/fault parts are identified using specified testing procedures
- Identified defects and faults are explained to the responsible person in accordance with company policy and procedures
- Results of diagnosis and testing are documented accurately and completely within the specified time
- Customers are advised / informed regarding the status and serviceability of the unit

LO3: Maintain/repair the power supply unit

- Personal protective equipment's are used in accordance with Occupational Health and Safety practices
- Defective parts/components are replaced with identical or recommended appropriate equivalent ratings
- Repaired or replaced parts/components are soldered/mounted in accordance with the current industry standards
- Control settings/adjustments are performed in conformity with service-manual specifications
- Repair activity is performed within the required timeframe
- Cleaning of unit is performed in accordance with standard procedures

LO4: Maintain/repair the power supply unit

- Rewinding process is performed in accordance with OH&S policies and procedures
- Process is checked according to established standards and requirements
- Test instruments required for the job are used to test the required parameters in accordance with the manufacturer's data and safety procedures

LO5: Test and inspect repaired products

- Assembling processes are performed in accordance with OH&S policies and procedures
- Process is checked according to established standards and requirements
- Assembled products are checked in accordance with quality standards

LO6: Test and inspect repaired products

- Repaired products are subjected to final visual inspection and testing in accordance with quality standards, procedures and requirements
- Work completion is documented and responsible person is informed in accordance with established procedures
- Housekeeping procedures are observed in accordance with 5S discipline and established procedures
- Waste materials are disposed of in accordance with environmental requirements

Resource requirement

EIS EEES2 M05 0322: Troubleshooting AC/DC power supply with single-phase input					
Item No.	**Category/Item**	**Description/ Specifications**	**Quantity**	**Recommended Ratio (Item: Trainee)**	
A.	***Learning Materials***				
1.	Troubleshooting Electronic Equipment without service data	Robert G. Middlefan	25pcs	1:25	
2	TTLM	Learning Guide	25 pcs	1:1	
		Assessment packet	1 pcs	1:25	
		Trainers guide	1 pcs	1:25	
B.	***Learning Facilities & Infrastructure***				
1.	Library[2]	10 x 12 meter	1rooms	1:25	
2	Lecture Room	6 x 7 meter			
3	Work shop	10 x 8 meter			
C.	***Consumable Materials***				
1.	Copper Wires	2.5 m.m^2	5 roll	1:5	
2.	Stranded Wires	2.5 m.m^2	5 roll	1:5	
3.	Diodes	1N4001-1N4007	1000 Pcs	40:1	
4	Jumper Wire	0.025-0.001mm Very thin laminated copper wire	5 roll	1:5	
5	Paste Flux	Rosin SP-44	pcs	1:1	
6	Thinner(Liquid)	Isopropyl Alcohol 1 ሊትር	pcs	1:1	
7	Electrolytic capacitor	2200 uf/35V,	1000 Pcs	40:1	
8	Electrolytic capacitor	1000 uf/35V	1000 Pcs	40:1	
9	Electrolytic capacitor	470 uf/35V	1000 Pcs	40:1	
10	Zenor diode	5V	200 pcs	8 : 1	
11	Zenor diode	7.1V	200 pcs	8 : 1	
12	Zenor diode	9.2 V	200 pcs	8 : 1	

13	Zenor diode	10.1 V	200 pcs	8 : 1
14	Zenor diode	12 V	200 pcs	8 : 1
15	Transistor	2SC1815	1000 Pcs	40 : 1
16	Regulator ICs	7805, 7809, 78012	1000 Pcs	40 : 1
17	Regulator ICs	7905, 7909, 79012	1000 Pcs	40 : 1
18	Regulator ICs	LM317, LM337,	400 Pcs	16 : 1
19	Transformer	220/24-0-24	25 pcs	1 : 1
20	Transformer	220/12-0-12	25 pcs	1 : 1
21	Transformer	220/9-0-9	25 pcs	1 : 1
22	Transformer	220/6-0-6	25 pcs	1 : 1
23	Light emitted diode	Green, white, yellow and red color	1000 Pcs	40 : 1
24	Resistor	470 ohm, 0.5watt	200 pcs	8 : 1
25	Resistor	560 ohm, 0.5watt	200 pcs	8 : 1
26	Resistor	820 ohm, 0.5watt	200 pcs	8 : 1
27	Resistor	1000 ohm, 0.5watt	200 pcs	8 : 1
28	Fuse	220V 5A, 220V 7A, 220V 10A	1000 Pcs	40 : 1
29	DC-Battery For multi-meter	9v DC Energizer	100Pc	4:1
D.	***Tools and Equipment***			
1.	**Soldering Iron Thin needle**	230V AC ,Watts(20-50W)	25 pcs	1:1
2.	Solder wire (Raga)	for any small mobile (techno/itel/smadel)	25 pcs	1:1
3.	Blade Cutter	for any mobile (techno/itel/smadel)	25 pcs	1:1
4.	electrical knife	Standard	25 pcs	1:1
5.	Side /Point Cutter/ With spring	for any small mobile (techno/itel/smadel)	25 pcs	1:1
6.	Nose Cutter	for any small mobile (techno/itel/smadel)	25 pcs	1:1
7.	Screwdriver kit	(T1,T2,T3,T4,T5,T6,Flate and plhipes)	25 pcs	1:1
8.	Tweezers/for saves/	to hold small electronic components d/t type	25 pcs	1:1
9.	Brush	For cleaning (big, small) 0.1-0.5mm	25 pcs	1:1
10.	Digital Multi-meter	AC/200M-750V/DC/200M-1000V	25 pcs	1:1

11.	Digital Multi meter battery	Energizer type 9 volts	25 pcs	1:1
12.	Ultrasonic Cleaner (serialize)	120 Watt. 5Liter	5pcs	1:5
13.	DC Power Supply	YH-30 D Output Voltage: 0 V to 15 V DC digital type	5 pcs	1:5
14.	Magnifying Lamp	magnified view 3x, 4x, 5x, 10x, 50x	25pcs	1:1
15.	Soldering Paste	PCB clear	25pcs	1:1
16.	Dis- soldering wire	Remove excess solder (size 1.5mm)	25pcs	1:1
17.	Electrician knife	Insulation removers	25pcs	1:1
18.	Screw driver(flat or Philips)	Small /medium size	25pcs	1:1
19.	Pliers/striper combination	Pliers finer	25pcs	1:1
20.	Side cut pliers	Cable cutter	25pcs	1:1
21.	Wire striper	Wire removers	25pcs	1:1
22.	Printed circuit board (PCB)	5x8cm	25pcs	1:1
23.	Printed circuit board	5x8cm, copper coated	25pcs	1:1
24.	Logic gates	NOT,AND,OR	25pcs	1:1
25.	Clamp ammeter	Digital	25pcs	1:1
26.	Soldering iron	**40w/30w**	25pcs	1:1
27.	Industrial socket(male & female)	3 phase	25pcs	1:1
28.	Digital capacitor meter	For capacitor only	25Pcs	1:1

LEARNING MODULE 07
TVET-PROGRAMME TITLE: **Electrical/Electronic Equipment Servicing II**
MODULE TITLE: **Constructing and Repairing Electric Mitad and Stove**
MODULE CODE: **EIS EEES2 M07 0322**
NOMINAL DURATION : **80 Hours**
MODULE DESCRIPTION: This module covers the knowledge, skills and attitudes required to maintain and repair Electric Mitad and Stove.it includes constructing, diagnosing faults, dismantling, re-assembling, testing and preparing report
LEARNING OUTCOMES At the end of the module the trainee will be able to: **LO1. Prepare unit, tools, equipment and workstation** **LO2. Construct Electric Mitad and Stove** **LO3. Diagnose faults of the unit** **LO4. Maintain/repair the unit** **LO5. Test repaired unit**
MODULE CONTENTS: **LO1. Prepare unit, tools, equipment and workstation** 1.1 Preparation of OHS and PPE 1.2 Arranging workplace for maintenance 1.3 Preparing tools, test instruments 1.4 Verifying repair/maintenance 1.5 Preparation of workplace/equipment **LO2. Construct Electric Mitad and Stove** **2.1** Producing Service manual **2.2** Constructing Mitad and stove **2.3** Testing and product **2.4** Complying completion procedures and documentations **2.5** Disposing Waste materials **LO3. Diagnose faults of the unit** **3.1** Implementing troubleshooting procedures

3.2 Observing systematic pre-testing procedure

3.3 Identifying System defect/fault symptoms.

3.4 Testing instruments

3.5 checking and isolating Circuits

3.6 Identifying, verifying and documented electric mitad

3.7 Explaining defects and faults

3.8 Checking Control settings/adjustments

3.9 Documenting of diagnosis and testing

3.10 Advising/informed Customers

LO4. **Maintain/repair the unit**

4.1 Using Personal protective equipment's

4.2 Replacing defective parts/components

4.3 Observing Care and extreme precaution

4.4 Replacing and Soldering Defective parts/components

4.5 Performing Cleaning

LO5. Test repaired unit

5.1 Assembling and Reassembling Repaired units

5.2 Testing, and cleaning final units

5.3 Compiling Service completion

5.4 Disposing Waste materials

Learning Methods:				
For none impaired trainees	**Reasonable Adjustment for Trainees with Disability (TWD)**			
	Low Vision	**Deaf**	**Hard of hearing**	**Physical impairment**
Lecture-discussion	❖ Provide large print text ❖ Prepare the lecture in **Audio/video** ❖ Organize the class room seating arrangement to be accessible to trainees ❖ Write short notes on the black/white board using large text ❖ Make sure the luminosity of the light of class room is kept ❖ Use normal tone of voice ❖ Encourage trainees to record the lecture in audio format ❖ Provide Orientation on the physical feature of the work shop ❖ Summarize main points	❖ Assign sign language interpreter ❖ Arrange the class room seating to be conducive for eye to eye contact ❖ Make sure the luminosity of the light of class room is kept ❖ Introduce new and relevant vocabularies ❖ Use short and clear sentences ❖ Give emphasis on visual lecture and ensure the attention of the trainees ❖ Avoid movement during lecture time ❖ Present the lecture in video format ❖ Summarize main points	❖ Organize the class room seating arrangement to be accessible to trainees ❖ Speak loudly ❖ Ensure the attention of the trainees ❖ Present the lecture in video format ❖ Ensure the attention of the trainees	❖ Organize the class room seating arrangement to be accessible for wheelchairs users. ❖ Facilitate and support the trainees who have severe impairments on their upper limbs to take note ❖ Provide Orientation on the physical feature of the work shop

Demonstration	❖ Conduct close follow up ❖ Use verbal description ❖ Provide special attention in the process of guidance ❖ facilitate the support of peer trainees ❖ Prepare & use simulation	❖ use Sign language interpreter ❖ Use video recorded material ❖ Ensure attention of the trainees ❖ Provide structured training ❖ Show clear and short method ❖ Use gesture ❖ rovide tutorial support (if necessary)	❖ Illustrate in clear & short method ❖ Use Video recorded material ❖ Ensure the attention of the trainees ❖ rovide tutorial support (if necessary)	❖ Facilitate and support the trainees having severe upper limbs impairment to operate equipments/ machines ❖ Assign peer trainees to assist ❖ Conduct close follow up ❖ rovide tutorial support (if necessary
Group discussion	❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member ❖ Brief the thematic issues of the work	❖ Use sign language interpreters ❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member	❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member ❖ Inform the group	❖ Introduce the trainees with their peers

			members to speak loudly	
Exercise	❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process	❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process/practical training ❖ Introduce new and relevant vocabularies	❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process/ practical training	❖ Assign peer trainees ❖ Use additional nominal hours if necessary
Individual assignment	❖ prepare the assignment questions in large text ❖ Encourage the trainees to prepare and submit the assignment in large texts ❖ Make available recorded assignment questions ❖ Facilitate the trainees to prepare and submit the assignment in soft or hard copy	❖ Use sign language interpreter ❖ Provide briefing /orientation on the assignment ❖ Provide visual recorded material	❖ Provide briefing /orientation on the assignment ❖ Provide visual recorded material	

ASSESSMENT METHODS:				
Interview		❖ Use sign language interpreter ❖ Ensure or conform whether the proper communication was conducted with the trainee through the service of the sign language interpreter ❖ Use short and clear questioning ❖ Time extension	❖ Speak loudly ❖ Using sign language interpreter if necessary	❖ Use written response as an option for the trainees having speech challenges
Written test	❖ Prepare the exam in large texts ❖ Use interview as an option if necessary ❖ Prepare the exam in audio format ❖ Assign human reader ❖ (if necessary) ❖ Time extension	❖ Prepare the exam using short sentences, multiple choices, True or False, matching and short answers ❖ Avoid essay writing ❖ Time extension	❖ Prepare the exam using short sentences, multiple choices, true or false, matching and short answers if necessary.	❖ Use oral response as an option to give answer for trainees having severe upper limb impairment ❖ Time extension for trainees having severe upper limb impairment
Demonstration/Observation	❖ Brief the instruction or provide them in large text ❖ Time extension	❖ Use sign language interpreter ❖ Brief on the instruction of the exam ❖ Provide activity-based/ practical assessment method ❖ Time extension	❖ Provide activity based assessment ❖ Brief on the instruction of the exam ❖ Use loud voice ❖ Time extension	❖ Provide activity based assessment ❖ Conduct close follow up ❖ Time extension

ASSESSMENT CRITERIA:

LO.1 Prepare unit, tools, equipment and workstation

- Workplace/equipment is made ready for construction and maintenance
- Repair/maintenance history is verified in line with the company procedures
- Workplace is set / arrange for repair job and for construction in accordance product standard procedure.
- Necessary tools, test instruments and personal protective equipment are prepared in line with job requirements

LO.2 Construct Electric Mitad and Stove

- Workplace/equipment is made ready for construction
- Personal protective equipment's are used in accordance with Occupational Health and Safety practice
- Service manual is produced accordance with the specification of the product.
- Construct Mitad and stove in accordance with the standard of safety procedure
- Test the product in accordance with the standard of safety procedure
- Construction completion procedures and documentations are complied with based on manual
- Waste materials are disposed of in accordance with environmental requirements

LO.3 Diagnose faults of the unit

- Complete check-up of electric mitad are conducted and defects are identified, verified and documented against customer description
- Systematic pre-testing procedure is observed in accordance with manufacturer's instructions
- System defect/fault symptoms are identified using appropriate tools and equipment and in accordance with safety procedures
- Test instruments required for the job are used in accordance with user manuals and safety procedures
- Proper troubleshooting procedures are implemented
- Circuits are checked and isolated using specified testing procedures
- Identified defects and faults are explained to the responsible person in accordance with enterprise or company policy and procedures

- Control settings/adjustments are checked in conformity with service-manual specifications
- Results of diagnosis and testing are documented accurately and completely within the specified timeframe
- Customers are advised/informed regarding the status and serviceability of the unit in accordance with company procedures

LO.4 Maintain/repair the unit

- Personal protective equipment's is used in accordance with Occupational Health and Safety practices
- Defective parts/components are replaced with identical or recommended appropriate equivalent ratings
- Repaired or replaced parts/components are soldered/mounted in accordance with the current industry standards
- Repair activity is performed within the required time frame
- Care and extreme precaution in handling the unit/product is observed as per procedures
- Cleaning of unit is performed in accordance with standard procedures

LO.5 Test repaired unit

- Repaired units are reassembled according to procedures
- Reassembled units are subjected to final testing and cleaning in conformity with manufacturer's specifications
- Service completion procedures and documentations are complied with based on manual
- Waste materials are disposed of in accordance with environmental requirements

Annex: Resource Requirements

EIS EEES2 07 0322 : Constructing and Repairing Electric Mitad and Stove				
Item No.	**Category/Item**	**Description/ Specifications**	**Quantity**	**Recommended Ratio (Item: Trainee)**
A.	***Learning Materials***			
	TTLM	Prepared by trainers	25 Pcs	1:1
1.	Power Electronics	Dr.P.S.Bimbhra	5 Pcs	1:5
B.	***Learning Facilities & Infrastructure***			
1	Library	10 x 12 meter	1room	1:25
2	Lecture Room	6 x 7 meter		
3	Work shop	10 x 8 meter		
C	**Consumable materials**			
1.	pen & ink	Red, blue and black	25 pcs	1:1
2.	Pencil	HP	25 pcs	1:1
3.	drafting, graph paper	A1	25 pcs	1:1
4.	tracing paper	A4	25 pcs	1:1
5.	eraser	Erase pencil	25 pcs	1:1
6.	Heating plate	1000 watts	25 pcs	1:1
7.	Circuit breaker	220V/25A	25 pcs	1:1
8	Circuit breaker	220V/20A	25 pcs	1:1
8.	Heating plate	500 watts	25 pcs	1:1
9	Kalki switch	25A	25 pcs	1:1
10	Plug(25A)	25A	25 pcs	1:1
11	resistor	1500Watt	25 pcs	1:1
12	resistor	1000Watt	25 pcs	1:1
13	resistor	300Watt	25 pcs	1:1

14	Three wire cable/3-line/	$2mm^2$	25 pcs	1:1
15	Three wire cable/3-line/	$4mm^2$	25 pcs	1:1
16	Local mitad	clay for mitad	25 pcs	1:1
17	Scriber, Weraja, and Jeso	for mitad making	25 pcs	1:1
D.	***Tools and Equipment***			
8	Soldering iron/gun	220V/50Hz	25 pcs	1:1
9	Screwdriver (assorted)	Philips type	25 pcs	1:1
10	Screwdriver (assorted)	Hexagonal type	25 pcs	1:1
11	Screwdriver (assorted)	Flat type	25 pcs	1:1
12	Nut drivers (assorted)	Standard type	25 pcs	1:1
15	Multi-meter (analog/digital)	AC/200M-750V/DC/200M-1000V	25pcs	1:5
16	Clamp meter	Multi Function (Ampere,Voltageand Ohms)	5pcs	1:5
17	Utility knife	5 pcs replaceable blade	5pcs	1:5
18	Wire stripper	150mm length .3-4.5mm ø	5pcs	1:5
19	Pliers (assorted)	130mm-155mm length	5pcs	1:5
20	work bench	Length 2m, height 80 cm, Width 1.2	5pcs	1:5
21	Test light	Lamp indicator	5pcs	1:5
22	Cleaning brush	Outside cleaning of copper, steel, brass, aluminum tubes	5pcs	1:5
23	Ball peen hammer	300gms-500gms	25pcs	1:5
28	Tweezers	Stain less steel	5pcs	1:1
29	Electric Mitad stand with all accessories.	Stand with all accessories.	25pcs	1:1
30	Electric stove stand with all accessories	Stand with all accessories.	25pcs	1:1

LEARNING MODULE – 08
TVET PROGRAM TITLE: **ELECTRICAL/ELECTRONICS EQUIPMENT SERVICING Level II**
MODULE TITLE: **Maintain and repair electric domestic appliance**
MODULE CODE: **EIS EEES2 M08 0322**
NOMINAL DURATION: **80Hours**
MODULE DESCRIPTION: The module aims to covers the knowledge, skills and attitudes required to maintain and repair electrical domestic appliances (**Toaster, flat iron, pressure cooker, Blender, coffee maker and waffle maker, Onion chopping, Coffee grinding).** It includes diagnosing faults, dismantling, re-assembling, testing and preparing reports.
LEARNING OUT COMES: After completing this module, the trainee will able to: **LO1- Prepare unit, tools, equipment and workstation** **LO2- Diagnose faults of the unit** **LO3- Maintain/repair the unit** **LO4- Test repaired unit**
MODULE CONTENT: **LO1- Prepare unit, tools, equipment and workstation** 1.1 Preparing workplace for maintenance 1.2 Preparing necessary tools, and test instruments 1.3 Setting and arranging equipment 1.4 Verifying repair & maintenance equipment 1.5 Requiring service manuals and service information **LO2- Diagnose faults of the unit** 2.1 Identifying electronically-controlled domestic appliances 2.1.1. Driers ,Blender, coffee maker and Toaster 2.1.2. Onion chopping and Coffee grinding 2.2 Pre-testing procedure 2.3 Identifying System defect/fault of domestic equipment symptoms 2.4 Implementing troubleshooting procedures 2.5 checking and isolating Circuits

2.6 Documenting results of diagnosis and testing procedures

2.7 Advising/informing Customers service

LO3- Maintain/repair the unit

3.1 Using Personal protective equipments

3.2 Electro-static discharge (ESD) protection procedure

3.3 Replacing soldering & mounting defective parts/components

3.4 Performing cleaning of unit

LO4- Test repaired unit

4.1 Reassembling repaired units

4.2 Final testing and cleaning reassembled units

4.3 Complying Service completion procedures and documentations

4.4 Disposing Waste materials

For none impaired trainees	Reasonable Adjustment for Trainees with Disability (TWD)			
	Low Vision	**Deaf**	**Hard of hearing**	**Physical impairment**
Lecture-discussion	❖ Provide large print text ❖ Prepare the lecture in **Audio/video** ❖ Organize the class room seating arrangement to be accessible to trainees ❖ Write short notes on the black/white board using large text ❖ Make sure the luminosity of the light of class room is	❖ Assign sign language interpreter ❖ Arrange the class room seating to be conducive for eye to eye contact ❖ Make sure the luminosity of the light of class room is kept ❖ Introduce new and relevant vocabularies ❖ Use short and clear	❖ Organize the class room seating arrangement to be accessible to trainees ❖ Speak loudly ❖ Ensure the attention of the trainees ❖ Present the lecture in video format ❖ Ensure the attention of the trainees	❖ Organize the class room seating Arrangement to be accessible for wheelchairs users. ❖ Facilitate and support the trainees who have severe impairments on their upper limbs to take note ❖ Provide Orientation on the physical feature of the work shop

	kept ❖ Use normal tone of voice ❖ Encourage trainees to record the lecture in audio format ❖ Provide Orientation on the physical feature of the work shop ❖ Summarize main points	sentences ❖ Give emphasis on visual lecture and ensure the attention of the trainees ❖ Avoid movement during lecture time ❖ Present the lecture in video format ❖ Summarize main points		
Demonstration	❖ Conduct close follow up ❖ Use verbal description ❖ Provide special attention in the process of guidance ❖ facilitate the support of peer trainees ❖ Prepare & use	❖ use Sign language interpreter ❖ Use video recorded material ❖ Ensure attention of the trainees ❖ Provide structured training ❖ Show clear and short	❖ Illustrate in clear & short method ❖ Use Video recorded material ❖ Ensure the attention of the trainees ❖ rovide tutorial support (if necessary)	❖ Facilitate and support the trainees having severe upper limbs impairment to operate equipments/ machines ❖ Assign peer trainees to assist ❖ Conduct close follow up ❖ vide tutorial support (if necessary

	simulation	method ❖ Use gesture ❖ rovide tutorial support (if necessary)		
Group discussion	❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member ❖ Brief the thematic issues of the work	❖ Use sign language interpreters ❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member	❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member ❖ Inform the group members to speak loudly	❖ Introduce the trainees with their peers

Exercise	❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process	❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process/practical training ❖ Introduce new and relevant vocabularies	❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process/ practical training	❖ Assign peer trainees ❖ Use additional nominal hours if necessary

ASSESSMENT METHODS:

Interview		❖ Use sign language interpreter ❖ Ensure or conform whether the proper communication was conducted with the trainee through the service of the sign language interpreter ❖ Use short and clear questioning ❖ Time extension	❖ Speak loudly ❖ Using sign language interpreter if necessary	❖ Use written response as an option for the trainees having speech challenges
Written test	❖ Prepare the exam in large texts ❖ Use interview as an option if necessary ❖ Prepare the exam in audio format ❖ Assign human reader ❖ (if necessary)	❖ Prepare the exam using short sentences, multiple choices, True or False, matching and short answers ❖ Avoid essay writing ❖ Time extension	❖ Prepare the exam using short sentences, multiple choices, true or false, matching and short answers if necessary.	❖ Use oral response as an option to give answer for trainees having severe upper limb impairment ❖ Time extension for trainees having severe upper limb impairment

	❖ Time extension			

ASSESSMENT CRITERIA

LO 1: Prepare unit, tools, equipment and workstation

- Workplace/equipment is made ready for maintenance
- Repair/maintenance history is verified in line with the company procedures
- Service manuals and service information required for repair/maintenance are acquired as per standard procedures.
- Workplace is set / arrange for repair job in accordance with company standard procedures
- Necessary tools, test instruments and personal protective equipment are prepared in line with job requirements

LO2: Diagnose faults of the unit

- Complete check-up of electronically-controlled domestic appliances is conducted and defects are identified, verified and documented against customer description
- Systematic pre-testing procedure is observed in accordance with manufacturer's instructions
- System defect/fault symptoms are identified using appropriate tools and equipment and in accordance with safety procedures
- Test instruments required for the job are used in accordance with user manuals and safety procedures
- Proper troubleshooting procedures are implemented
- Circuits are checked and isolated using specified testing procedures
- Identified defects and faults are explained to the responsible person in accordance with enterprise or company policy and procedures
- Control settings/adjustments are checked in conformity with service-manual specifications
- Results of diagnosis and testing are documented accurately and completely within the specified timeframe

LO3: Maintain/repair the unit

- Personal protective equipments are used in accordance with Occupational Health and Safety practices
- Electro-static discharge (ESD) protection procedure is followed in accordance with current industry standards
- Defective parts/components are replaced with identical or recommended appropriate equivalent ratings
- Repaired or replaced parts/components are soldered/mounted in accordance with the current industry standards
- Control settings/adjustments are performed in conformity with service-manual specifications
- Repair activity is performed within the required timeframe
- Care and extreme precaution in handling the unit/product is observed as per procedures

LO4- Test repaired unit

- Repaired units are reassembled according to procedures
- Reassembled units are subjected to final testing and cleaning in conformity with manufacturer's specifications
- Service completion procedures and documentations are complied with based on manual
- Waste materials are disposed of in accordance with environmental requirements

Annex: Resource Requirements

EIS EEES2 M08 0322 :Maintain and repair electric domestic appliance				
Item No.	**Category/Item**	**Description/ Specifications**	**Quantity**	**Recommended Ratio (Item: Trainee)**
A.	***Learning Materials***			
1	TTLM	Prepared by trainers	25	1:1
2	Digital fundamentals	Thomas L.Floyd	5	1:5
3	Power Electronics	Dr.P.S.Bimbhra	5	1:5
B.	**Learning Facilities & Infrastructure**			
1	Library	10 x 12 meter	1rooms	1:25
2	Lecture Room	6 x 7 meter		
3	Work shop	10 x 8 meter		
4	Lift	Standard for 25 trainees	1	1:25
C	**Consumable materials**			
1.	Pen & ink	Red, blue and black	25 pcs	1:1
2.	Pencil	Erasable type	25 pcs	1:1
3.	Drafting, graph paper	A1	25 pcs	1:1
4.	Tracing paper	A4	25 pcs	1:1
5.	Eraser	Erase pencil	25 pcs	1:1
6.	Heating plate	1000 watts	25 pcs	1:1
7.	Circuit breaker	220V/20A	25 pcs	1:1
8.	Heating plate	500 watts	25 pcs	1:1
9	Soldering lead	1mm rosin flux	5 rolls	1:5
D.	***Tools and Equipment***			
1	Driers	220V/50Hz, 1200watts	5pcs	1:5
2	Blender, coffee maker	220V/50Hz 1.5 liter	5pcs	1:5
3	Toaster, waffle maker	220V/50Hz	5pcs	1:5
4	Flat irons and presses	220V/50Hz	5pcs	1:5

5	Onion chopping	220V/50Hz 2 liters ,2HP	5pcs	1:5
6	Coffee grinding	220V/50Hz /400watts	5pcs	1:5
7	Step-down transformer	220v/12v	5pcs	1:5
8	Soldering iron/gun	220V/50Hz	5pcs	1:5
9	Screwdriver (assorted)	Philips type	25 pcs	1:1
10	Screwdriver (assorted)	Hexagonal type	25 pcs	1:1
11	Screwdriver (assorted)	Flat type	25 pcs	1:1
12	Nut drivers (assorted)	Standard type	25 pcs	1:1
13	Wrenches (assorted)	Standard type	25 pcs	1:1
14	Allen wrench/key	Standard type	25 pcs	1:1
15	Multi-testers (analog/digital)	Multi Function (Ampere,Voltageand Ohms)	5 pcs	1:5
16	Clamp meter	Multi Function (Ampere,Voltageand Ohms)	25 pcs	1:5
17	Utility knife	5 pcs replaceable blade	25 pcs	1:1
18	Wire stripper	150mm length .3-4.5mm ⌀	25 pcs	1:1
19	Pliers (assorted)	130mm-155mm length	25 pcs	1:1
20	work bench	Length 2m, height 80 cm, Width 1.2	25 pcs	**1:1**
21	Test light	Lamp indicator	25 pcs	1:1
22	cleaning brush	Outside cleaning of copper, steel, brass, aluminum tubes	25 pcs	1:1
23	Ball peen hammer	300gms-500gms	25 pcs	1:1
24	Blade of onion chopper	Stain less steel	25 pcs	1:1
28	Tweezers	Stain less steel	25 pcs	1:1
31	multi-testers (analog/digital)	Multi Function (Ampere,Voltageand Ohms)	pcs	1:5
32	Clamp meter	Multi Function (Ampere,Voltageand Ohms)	pcs	1:5
33	Utility knife	5 pcs replaceable blade	pcs	1:1

LEARNING MODULE 09
TVET-PROGRAMME TITLE: Electrical/Electronic Equipment Servicing **Level II**
MODULE TITLE: **Maintaining and Repairing Micro Wave oven**
MODULE CODE:**EIS EEES2 M09 0322**
NOMINAL DURATION: **60 Hours**
MODULE DESCRIPTION: This module covers the competence required to maintain and repair **Micro Wave oven**. It includes diagnosing faults, dismantling, re-assembling, testing and preparing reports.
LEARNING OUTCOMES. At the end of the module the trainee will be able to: **LO1.Prepare unit, tools, equipment and workstation** **LO2.Diagnose faults of the unit.** **LO3. Maintain/repair the unit.** **LO4.Test repaired unit**
MODULE CONTENTS: **LO1. Prepare unit, tools, equipment and workstation** 1.1. Making workplace/equipment ready for maintenance 1.2. Verifying repair/maintenance history. 1.3. Acquiring service manuals and service information. 1.4. Setting / arranging workplace for repair. 1.5. Preparing necessary tools, test instruments and personal protective equipment. **LO2. Diagnose faults of the unit** 2.1 Observing systematic pre-testing procedure 2.2 Conducting complete check-up of Micro Wave oven 2.3 Identifying system defect/fault symptoms. 2.4 Requiring test instruments with user manuals

2.5 Implementing proper troubleshooting procedures.

2.6 Checking isolated Circuits using specified testing procedures.

2.7 Explaining Identified defects and faults.

2.8 Checking control settings/adjustments.

2.9 Documenting results of diagnosis and testing.

2.10 Advising/informing Customers.

LO3. Maintain/repair the unit

3.1. Using Personal protective equipment's.

3.2. Following electro-static discharge (ESD) protection procedure.

3.3. Replacing defective parts/components.

3.4. Soldering, mounting and repairing parts/components.

3.5. Performing control settings/adjustments.

3.6. Performing repair activity

3.7. Observing care and extreme precaution the unit/product

3.8. Performed Cleaning of units.

LO4. Test repaired unit

4.1. Reassembling repaired units.

4.2. Testing and cleaning reassembled units.

4.3. Compiling documentations.

4.4. Disposing waste materials.

LEARNING METHODS:			
For None Impaired Trainees	**Reasonable Adjustment for Trainees with Disability (TWD)**		
	Deaf	**Hard of hearing**	**Physical impairment**
Lecture-discussion	❖ Assign sign language interpreter ❖ Arrange the class room seating to be conducive for eye to eye contact ❖ Make sure the luminosity of the light of class room is kept ❖ Introduce new and relevant vocabularies ❖ Use short and clear sentences ❖ Give emphasis on visual lecture and ensure the attention of the trainees ❖ Avoid movement during lecture time ❖ Present the lecture in video format ❖ Summarize main points	❖ Organize the class room seating arrangement to be accessible to trainees ❖ Speak loudly ❖ Ensure the attention of the trainees ❖ Present the lecture in video format ❖ Ensure the attention of the trainees	❖ Organize the class room seating arrangement to be accessible for wheelchairs users. ❖ Facilitate and support the trainees who have severe impairments on their upper limbs to take note ❖ Provide Orientation on the physical feature of the work shop
Demonstration	❖ use Sign language interpreter ❖ Use video recorded material ❖ Ensure attention of the trainees ❖ Provide structured training	❖ Illustrate in clear & short method ❖ Use Video recorded material ❖ Ensure the attention of the	❖ Facilitate and support the trainees having severe upper limbs impairment to operate equipments/ machines ❖ Assign peer trainees to assist

	❖ Show clear and short method ❖ Use gesture ❖ provide tutorial support (if necessary)	trainees ❖ provide tutorial support (if necessary)	❖ Conduct close follow up ❖ Provide tutorial support (if necessary
Group discussion	❖ Use sign language interpreters ❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member	❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member ❖ Inform the group members to speak loudly	❖ Introduce the trainees with their peers
Exercise	❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process/practical training ❖ Introduce new and relevant vocabularies	❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process/ practical training	❖ Assign peer trainees ❖ Use additional nominal hours if necessary
Individual assignment	❖ use sign language interpreter ❖ provide briefing /orientation on the assignment	Provide briefing /orientation on the assignment Provide visual recorded material	

	❖ provide visual recorded material		
Interview	❖ Use sign language interpreter ❖ Ensure or conform whether the proper communication was conducted with the trainee through the service of the sign language interpreter ❖ Use short and clear questioning ❖ Time extension	❖ Speak loudly ❖ Using sign language interpreter if necessary	❖ Use written response as an option for the trainees having speech challenges
Written test	❖ Prepare the exam using short sentences, multiple choices, True or False, matching and short answers ❖ Avoid essay writing ❖ Time extension	❖ Prepare the exam using short sentences, multiple choices, True or False, matching and short answers if necessary	❖ Use oral response as an option to give answer for trainees having severe upper limb impairment ❖ Time extension for trainees having severe upper limb impairment
Demonstration/Observation	❖ Use sign language interpreter ❖ Brief on the instruction of the exam ❖ Provide activity-based/ practical assessment method ❖ Time extension	❖ Provide activity based assessment ❖ Brief on the instruction of the exam ❖ Use loud voice ❖ Time extension	❖ Provide activity based assessment ❖ Conduct close follow up ❖ Time extension

ASSESSMENT CRITERIA:

LO.1. Prepare unit, tools, equipment and workstation

- Workplace/equipment is made ready for maintenance
- Repair/maintenance history is verified in line with the company procedures
- Service manuals and service information required for repair/maintenance are acquired as per standard procedures.
- Workplace is set / arrange for repair job in accordance with company standard procedures
- Necessary tools, test instruments and personal protective equipment are prepared in line with job requirements

LO.2 Diagnose faults of the unit

- Complete check-up of Micro Wave oven is conducted and defects are identified, verified and documented against customer description
- Systematic pre-testing procedure is observed in accordance with manufacturer's instructions
- System defect/fault symptoms are identified using appropriate tools and equipment and in accordance with safety procedures
- Test instruments required for the job are used in accordance with user manuals and safety procedures
- Proper troubleshooting procedures are implemented
- Circuits are checked and isolated using specified testing procedures
- Identified defects and faults are explained to the responsible person in accordance with enterprise or company policy and procedures
- Control settings/adjustments are checked in conformity with service-manual specifications
- Results of diagnosis and testing are documented accurately and completely within the specified timeframe
- Customers are advised/informed regarding the status and serviceability of the unit in accordance with company procedures

LO.3Maintain/repair the unit

- Personal protective equipment's are used in accordance with Occupational Health and Safety practices
- Electro-static discharge (ESD) protection procedure is followed in accordance with current industry standards
- Defective parts/components are replaced with identical or recommended appropriate equivalent

ratings

- Repaired or replaced parts/components are soldered/mounted in accordance with the current industry standards
- Control settings/adjustments are performed in conformity with service-manual specifications
- Repair activity is performed within the required timeframe
- Care and extreme precaution in handling the unit/product is observed as per procedures
- Cleaning of unit is performed in accordance with standard procedures

LO.4Test repaired unit

- Repaired units are reassembled according to procedures
- Reassembled units are subjected to final testing and cleaning in conformity with manufacturer's specifications
- Service completion procedures and documentations are complied with based on manual
- Waste materials are disposed of in accordance with environmental requirements

EISEEES2 M09 0322 :Maintain and Repair Micro Wave oven				
Item No.	**Category/Item**	**Description/ Specifications**	**Quantity**	**Recommended Ratio (Item: Trainee)**
A.	***Learning Materials***			
1.	TTLM	By trainers	25	1:25
2.	Digital Electronics and Design with VHDL	VolneiA.Pedroni	25	1:25
3.	***Learning Facilities & Infrastructure***			
4.	Library	10 x 12 meter	1rooms	1:25
5.	Lecture Room	6 x 7 meter		
6.	Work shop	10 x 8 meter		
7.	***Consumable Materials***			
8.	Drawing Papers	White plane paper with size of A4,A3,A1&A2	pcs	1:1
9.	Pencils	Wooden pencil and mechanical pencil	pcs	1:1
10.	Sharper		pcs	1:1
11.	Eraser	Gum type eraser	pcs	1:1
12.	***Tools and Equipments***			
13.	soldering iron/gun	Plastic type	pcs	1:1
14.	screwdriver (assorted)	Plastic type	pcs	1:1
15.	nut drivers (assorted)	Plastic type	pcs	1:1
16.	wrenches (assorted)	Plastic type	pcs	1:1
17.	Allen wrench/key	Plastic type	pcs	1:1
18.	multi-testers (analog/digital)	Plastic type	pcs	1:1
19.	multi-testers (analog/digital)	220v-750v AC	pcs	1:1
20.	Clamp meter	2MA-1000A	pcs	1:1
21.	utility knife	Insulation Remover	pcs	1:1

LEARNING MODULE 10
TVET-PROGRAMME TITLE: **Electrical/Electronic Equipment Servicing Level II**
MODULE TITLE: **Maintain and Repair Washing Machine**
MODULE CODE: **EISE EES2 M10 0322**
NOMINAL DURATION: **60Hours**
MODULE DESCRIPTION : This module covers knowledge, skills and attitudes required to maintain and repair **Washing Machine.** It includes diagnosing faults, dismantling, re-assembling, testing and preparing reports.
LEARNING OUTCOMES At the end of the module the trainee will be able to: **LO1. Prepare unit, tools, equipment and workstation** **LO2. Diagnose faults of the unit** **LO3. Maintain/repair the unit** **LO4. Test repaired unit**
MODULE CONTENTS: **LO1: Prepare unit, tools, equipment and workstation.** 1.1. Making ready workplace/equipment 1.2. Verifying repair/maintenance history. 1.3. Requiring and obtaining Service manuals for repair/maintenance 1.4. Setting / arranging workplace company standard procedures 1.5. Preparing necessary tools and test instruments with PPE **LO2. Diagnose faults of the unit** 2.1 Conducting complete check-up of Washing Machines 2.2 Observing systematic pre-testing procedure 2.3 Identifying system defects/ fault symptoms. 2.3.1 Common faults of washing Machines 2.3.2 Using test points 2 4. Using test instruments 2.5. Implementing troubleshooting procedures 2.6. Checking and isolating Circuits using testing procedures 2.5 Identifying defects and faults. 2.6 Checking Control settings/adjustments.

2.7 Completing documentation of results of diagnosis and testing

2.8 Advising Customers

LO3. Maintain/repair the unit

3.1. Using Occupational Health and Safety practices.

3.2. Following electro-static discharge (ESD) protection procedure.

3.3. Replacing defective parts/components with appropriate equivalent ratings

3.4. Soldering/mounting and repairing defective parts & components

3.5. Performing Control settings/adjustments

3.6. Performing repair activity within the timeframe

3.7. Observing care and extreme precaution in handling the unit/product.

LO4: Test repaired unit

4.4 Repairing and reassembling

4.5 Testing and cleaning the final reassembling units

4.6 Compiling documentations.

4.7 Disposing waste materials.

LEARNING METHODS:			
For None Impaired Trainees	**Reasonable Adjustment for Trainees with Disability (TWD)**		
	Deaf	**Hard of hearing**	**Physical impairment**
Lecture-discussion	❖ Assign sign language interpreter ❖ Arrange the class room seating to be conducive for eye to eye contact ❖ Make sure the luminosity of the light of class room is kept ❖ Introduce new and relevant vocabularies ❖ Use short and clear sentences ❖ Give emphasis on visual lecture and ensure the attention of the trainees ❖ Avoid movement during lecture time ❖ Present the lecture in video format ❖ Summarize main points	❖ Organize the class room seating arrangement to be accessible to trainees ❖ Speak loudly ❖ Ensure the attention of the trainees ❖ Present the lecture in video format ❖ Ensure the attention of the trainees	❖ Organize the class room seating arrangement to be accessible for wheelchairs users. ❖ Facilitate and support the trainees who have severe impairments on their upper limbs to take note ❖ Provide Orientation on the physical feature of the work shop
Demonstration	❖ use Sign language interpreter ❖ Use video recorded material ❖ Ensure attention of the trainees ❖ Provide structured training	❖ Illustrate in clear & short method ❖ Use Video recorded material ❖ Ensure the attention of the	❖ Facilitate and support the trainees having severe upper limbs impairment to operate equipments/ machines ❖ Assign peer trainees to assist

	❖ Show clear and short method ❖ Use gesture ❖ provide tutorial support (if necessary)	trainees ❖ provide tutorial support (if necessary)	❖ Conduct close follow up ❖ Provide tutorial support (if necessary
Group discussion	❖ Use sign language interpreters ❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member	❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member ❖ Inform the group members to speak loudly	❖ Introduce the trainees with their peers
Exercise	❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process/practical training ❖ Introduce new and relevant vocabularies	❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process/ practical training	❖ Assign peer trainees ❖ Use additional nominal hours if necessary
Individual assignment	❖ use sign language interpreter ❖ provide briefing /orientation on the assignment	Provide briefing /orientation on the assignment Provide visual recorded material	

	❖ provide visual recorded material		
Interview	❖ Use sign language interpreter ❖ Ensure or conform whether the proper communication was conducted with the trainee through the service of the sign language interpreter ❖ Use short and clear questioning ❖ Time extension	❖ Speak loudly ❖ Using sign language interpreter if necessary	❖ Use written response as an option for the trainees having speech challenges
Written test	❖ Prepare the exam using short sentences, multiple choices, True or False, matching and short answers ❖ Avoid essay writing ❖ Time extension	❖ Prepare the exam using short sentences, multiple choices, True or False, matching and short answers if necessary	❖ Use oral response as an option to give answer for trainees having severe upper limb impairment ❖ Time extension for trainees having severe upper limb impairment
Demonstration /Observation	❖ Use sign language interpreter ❖ Brief on the instruction of the exam ❖ Provide activity-based/ practical assessment method ❖ Time extension	❖ Provide activity based assessment ❖ Brief on the instruction of the exam ❖ Use loud voice ❖ Time extension	❖ Provide activity based assessment ❖ Conduct close follow up ❖ Time extension

ASSESMENT CRITERIA:

LO1. Prepare unit, tools, equipment and workstation

- Workplace/equipment is made ready for maintenance
- Repair/maintenance history is verified in line with the company procedures
- Service manuals and service information required for repair/maintenance are acquired as per standard procedures.
- Workplace is set / arrange for repair job in accordance with company standard procedures
- Necessary tools, test instruments and personal protective equipment are prepared in line with job requirements

LO2. Diagnose faults of the unit

- Complete check-up of Washing Machines conducted and defects are identified, verified and documented against customer description
- Systematic pre-testing procedure is observed in accordance with manufacturer's instructions
- System defect/fault symptoms are identified using appropriate tools and equipment and in accordance with safety procedures
- Test instruments required for the job are used in accordance with user manuals and safety procedures
- Proper troubleshooting procedures are implemented
- Circuits are checked and isolated using specified testing procedures
- Identified defects and faults are explained to the responsible person in accordance with enterprise or company policy and procedures
- Control settings/adjustments are checked in conformity with service-manual specifications
- Results of diagnosis and testing are documented accurately and completely within the specified timeframe
- Customers are advised/informed regarding the status and serviceability of the unit in accordance with company procedures

LO3: Maintain/repair the unit

- Personal protective equipment's are used in accordance with **Occupational Health and Safety** practices
- Electro-static discharge (ESD) protection procedure is followed in accordance with current industry standards

- Defective parts/components are replaced with identical or recommended appropriate equivalent ratings
- Repaired or replaced parts/components are soldered/mounted in accordance with the current industry standards
- Control settings/adjustments are performed in conformity with service-manual specifications
- Repair activity is performed within the required timeframe
- Care and extreme precaution in handling the unit/product is observed as per procedures
- Cleaning of unit is performed in accordance with standard procedures

LO4. Test repaired unit

- Repaired units are reassembled according to procedures
- Reassembled units are subjected to final testing and cleaning in conformity with manufacturer's specifications
- Service completion procedures and documentations are complied with based on manual
- Waste materials are disposed of in accordance with environmental

A11. Resource requirement

EISEEES2 10 0322: Maintain and Repair Washing Machine				
Item No	**Category /Item**	**Description / Specification**	**Quality**	**Recommendation (Item, Training)**
A	***Learning Material***			
1	TTLM	Prepared by trainers	25	1 : 25
2	Electronic Testing & Diagnosis	Love Day G.C	5	1 : 5
B	***Learning Facility& Infrastructure***			
1	Library	10 x 12 meter	1rooms	1 : 25
2	Lecture Room	6 x 7 meter		
3	Work shop	10 x 8 meter		
C	***Consumable Material***			
1.	Soldering lead	40 by 60 tin lead/1.5mm/	Roll	1 : 1
2.	Digital Multi meter battery	Energizer type 9V	pcs	1 :1
3.	Flux	Rosin SP-44	pcs	1 : 1
4.	Brush	For cleaning (big, small) 0.1-0.5mm	pcs	1 : 1
5.	Thinner(Liquid)	Isopropyl Alcohol	Liter	1 :1
6.	stranded wires	1.5 mm^2 and 2.5 mm^2	Roll	1 : 1
7.	Ultrasonic Cleaner (serialize)	Standard	pcs	1 : 1
8.	Grease	Silicon Grease	Gallons	1 : 1
9. 9	Soldering Paste	PCB clear	pcs	1 : 1
10.	Paper	A4	pcs	1 : 1
D	***Tools & Equipment's***			
1.	soldering iron/gun	220V/50Hz	pcs	1 : 1
2.	screwdriver (assorted)	Philips type	pcs	1 : 1
3.	screwdriver (assorted)	Hexagonal type	pcs	1 : 1
4.	screwdriver (assorted)	Flat type	pcs	1 : 1
5.	nut drivers (assorted)	Standard type	pcs	1 : 1
6.	wrenches (assorted)	Standard type	pcs	1 : 1

7.	Allen wrench/key	Standard type	pcs	1 : 1
8.	multi-testers (analog/digital)	Multi Function (Ampere, Voltage and Ohms)	pcs	1 : 1
9.	Clamp meter	Multi Function (Ampere, Voltage and Ohms)	pcs	1:1
10.	Utility knife	5 pcs replaceable blade	pcs	1:1
12	work bench	Length 2m, height 80 cm, Width 1.2	pcs	1:1
13	flashlight and test light	Lamp indicator	pcs	1;1
F	***parts/components***			
1. 1	Washing Machines and Driers	Any brand	pcs	1:5
2. 2	Pump Vanes	Any brand	pcs	1:5
3. 3	Wash motor	70W/90W/120W	pcs	1:5
4. 4	Spin motor	70W/90W/120W	pcs	1:5
5.	Wash Timer	Any brand	pcs	1:5
6.	Belt – for washing machine	Any brand	pcs	1:5
7.	Gear box	Any brand	pcs	1:5

LEARNING MODULE 10

TVET-PROGRAMME TITLE: **Electrical/Electronic Equipment Servicing Level II**

MODULE TITLE: **Installing and Repairing Multimedia equipment**

MODULE CODE: **EISE EES2 M11 0322**

NOMINAL DURATION: **150hours**

MODULE DESCRIPTION: This module covers the knowledge, skills and attitudes required to maintain and repair Gepps, public address system**(PAS),Mixer ,musical instrument and video camera systems** including selecting, installing, diagnosing faults, reassembling, testing and preparing reports.

LEARNING OUTCOMES

At the end of the module the trainee will be able to:

LO1. Prepare unit, tools and workstation

LO2. Diagnose faults

LO3. Install and repair product

LO4. Test repaired product

MODULE CONTENTS:

LO1 Prepare unit, tools and workstation.

1.1. Preparing workstation and work specifications for repair job

1.2 Preparing necessary tools and test instruments with PPE.

1.3Identifying and conducting, audio systems and products defects

1.3.1. Audio-equipment and Systems

1.3.1.1 GEEPAS and Amplifier

1.3.1.3. Electronic musical instruments/keyboards

1.3.1.4. Professional audio/Public-address (PA) systems and Mixer

1.4. Verifying repair/maintenance history.

1.5. Requiring and obtaining Service manuals for repair/maintenance

LO2. Diagnose faults

2.1. Observing systematic pre-testing procedure with in manufacturer's instructions

2.1.1 Visual inspection of the unit with power off

2.1.2. Interview of customer re history of unit

2.2. Identifying system defects/fault symptoms.

2.3 Using test instruments with user manuals.

2.4. checking and isolating Circuits using specific testing procedures

2.5. Identifying defects and faults.

2.6. Checking Control settings/adjustments.

2.7. Completing documentation.

2.7. Advising Customers.

LO3. Install and repair product

3.1. Using personal protective equipment with OHS practices.

3.2. Following electro-static discharge (ESD) protection procedure

3.3. Replacing defective parts/components with appropriate equivalent ratings

3.4. soldering and Repairing defective parts & components

3.5. Performing Control settings/adjustments

3.6. Installing and configuring multimedia components/equipment's

3.7. Performing repair activity

3.8. Observing care and extreme precaution

LO4: Test repaired product

4.1 Repairing and reassembling units.

4.2 Testing and cleaning the final reassembling units

4.3 Compiling documentations.

4.4 Disposing waste materials.

Learning Methods:				
For none mpaired trainees	**Reasonable Adjustment for Trainees with Disability (TWD)**			
	Low Vision	**Deaf**	**Hard of hearing**	**Physical impairment**
Lecture-discussion	❖ Provide large print text ❖ Prepare the lecture in **Audio/video** ❖ Organize the class room seating rrangement to be accessible to trainees ❖ Write short notes on the black/white oard using large text ❖ Make sure the luminosity of the ight of class room is kept ❖ Use normal tone of voice ❖ Encourage trainees to record the ecture in audio format ❖ Provide Orientation on the physical eature of the work shop ❖ Summarize main points	❖ Assign sign language nterpreter ❖ Arrange the class room eating to be conducive for eye to ye contact ❖ Make sure the luminosity f the light of class room is kept ❖ Introduce new and relevant ocabularies ❖ Use short and clear entences ❖ Give emphasis on visual ecture and ensure the attention of he trainees ❖ Avoid movement during ecture time ❖ Present the lecture in video	❖ Organize the lass room seating rrangement to be ccessible to trainees ❖ Speak loudly ❖ Ensure the ttention of the trainees ❖ Present the ecture in video format ❖ Ensure the ttention of the trainees	❖ Organize he class room eating rrangement to be ccessible for vheelchairs users. ❖ Facilitate nd support the rainees who have evere mpairments on heir upper limbs o take note ❖ Provide Orientation on the hysical feature of he work shop

		ormat ❖ Summarize main points		
Demonstration	❖ Conduct close follow up ❖ Use verbal description ❖ Provide special attention in the rocess of guidance ❖ facilitate the support of peer trainees ❖ Prepare & use simulation ❖ Use video	❖ use Sign language nterpreter ❖ Use video recorded material ❖ Ensure attention of the rainees ❖ Provide structured training ❖ Show clear and short nethod ❖ Use gesture ❖ ovide tutorial support (if necessary)	❖ Illustrate in lear & short method ❖ Use Video ecorded material ❖ Ensure the ttention of the trainees ❖ ovide tutorial support (if necessary)	❖ Facilitate nd support the rainees having evere upper limbs mpairment to perate quipments/ nachines ❖ Assign eer trainees to ssist ❖ Conduct lose follow up ❖ ovide tutorial upport (if necessary
Group discussion	❖ Facilitate the integration of trainees vith group members	❖ Use sign language nterpreters	❖ Facilitate the ntegration of trainees	❖ Introduce he trainees with

	❖ Conduct close follow up ❖ Introduce the trainees with other group member ❖ Brief the thematic issues of the work	❖ Facilitate the integration of trainees with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member	with group members ❖ Conduct close follow up ❖ Introduce the trainees with other group member ❖ Inform the group members to speak loudly	heir peers
Exercise	❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process	❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process/practical training ❖ Introduce new and relevant vocabularies	❖ Conduct close follow up and guidance ❖ Provide tutorial support if necessary ❖ provide special attention in the process/ practical training	❖ Assign peer trainees ❖ Use additional nominal hours if necessary

Individual assignment	❖ prepare the assignment questions in arge text ❖ Encourage the trainees to prepare and ubmit the assignment in large texts ❖ Make available recorded assignment uestions ❖ Facilitate the trainees to prepare and ubmit the assignment in soft or hard copy	❖ Use sign language nterpreter ❖ Provide briefing orientation on the assignment ❖ Provide visual recorded naterial	❖ Provide briefing orientation on the ssignment ❖ Provide visual ecorded material	

ASSESSMENT METHODS:				
Interview		❖ Use sign language interpreter ❖ Ensure or conform whether the proper communication was conducted with the trainee through the service of the sign language interpreter ❖ Use short and clear questioning ❖ Time extension	❖ Speak loudly ❖ Using sign language interpreter if necessary	❖ Use written response as an option for the trainees having speech challenges
Written test	❖ Prepare the exam in large texts ❖ Use interview as an option if necessary ❖ Prepare the exam in audio format ❖ Assign human reader ❖ (if necessary) ❖ Time extension	❖ Prepare the exam using short sentences, multiple choices, True or False, matching and short answers ❖ Avoid essay writing ❖ Time extension	❖ Prepare the exam using short sentences, multiple choices, true or false, matching and short answers if necessary.	❖ Use oral response as an option to give answer for trainees having severe upper limb impairment ❖ Time extension for trainees having severe upper limb impairment
Demonstration /Observation	❖ Brief the instruction or provide them in large text ❖ Time extension	❖ Use sign language interpreter ❖ Brief on the instruction of the exam	❖ Provide activity based assessment ❖ Brief on the	❖ Provide activity based assessment ❖ Conduct close follow up

ASSESSMENT CRITERIA:

LO.1: Prepare unit, tools and workstation.

- Complete check-up of audio systems and products is conducted and defects are identified, verified and documented against customer description
- Repair/maintenance history is verified in line with the company procedures
- Service manuals and service information required for repair/maintenance are acquired as per standard procedure
- Workstation is set/prepared for repair job in line with the company requirements and work specifications
- Necessary tools, test instruments and personal protective equipment are prepared in line with job requirements

LO.2 : Diagnose faults

- Systematic pre-testing procedure is observed in accordance with manufacturer's instructions
- System defects/fault symptoms are identified using appropriate tools and equipment and in accordance with safety procedures
- Test instruments required for the job are used in accordance with user manuals
- Circuits are checked and isolated using specified testing procedures
- Identified defects and faults are explained to the responsible person in accordance with enterprise or company policy and procedures
- Control settings/adjustments are checked in conformity with service-manual specifications
- Results of diagnosis and testing are documented accurately and completely within the specified time
- Customers are advised / informed regarding the status and serviceability of the unit according to company procedures

LO.3: **Install and repair product**

- Personal protective equipment is used in accordance with Occupational Health and Safety practices
- Electro-static discharge (ESD) protection procedure is followed in accordance with current industry standards
- Defective parts/components are replaced with identical or recommended appropriate equivalent ratings
- Repaired or replaced parts/components are soldered/mounted in accordance with the current industry standards
- Install and configure multimedia components/equipment's
- Control settings/adjustments are performed in conformity with service-manual specifications
- Repair activity is performed within the required timeframe
- Care and extreme precaution in handling the unit/product is observed as per procedures
- Cleaning of unit is performed in accordance with standard procedures.

LO.4 : **Test repaired product**

- Repaired units are reassembled according to manufacturer's specifications
- Reassembled units are subjected to final testing and cleaning in conformity with manufacturer's

specifications

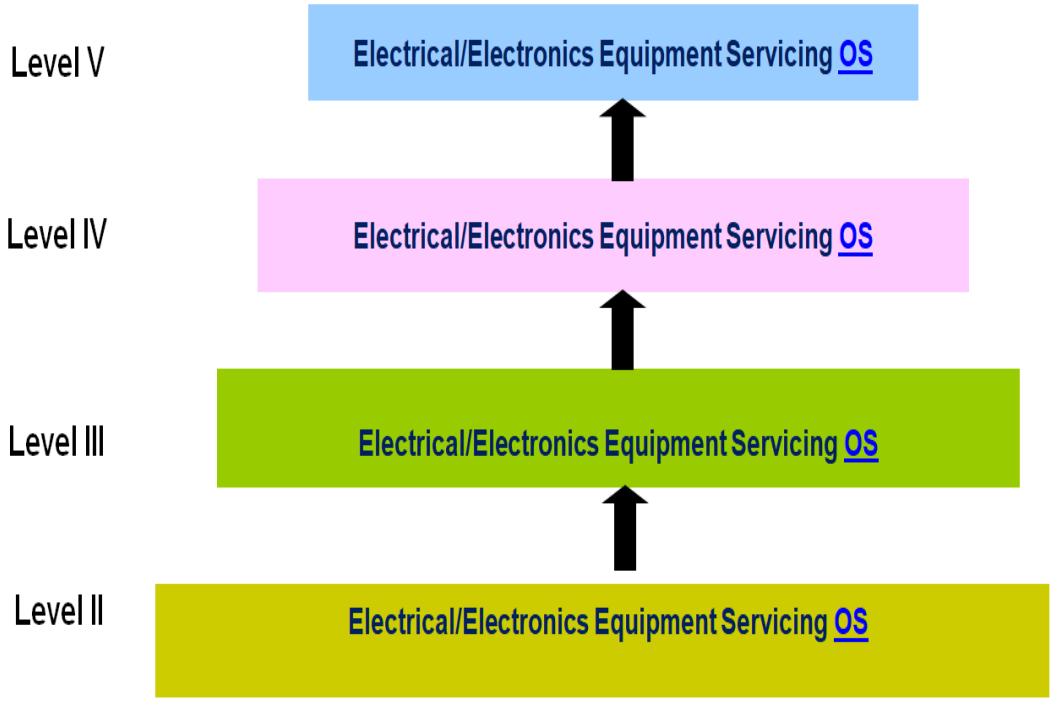
- Service completion procedures and documentations are complied with based on workplace requirements
- Waste materials are disposed of in accordance with environmental requirements.

Annex: Resource Requirements

EISE EES2 M10 0322 : **Installing and Repairing Multimedia equipment**				
Item No.	**Category/Item**	**Description/ Specifications**	**Quantity**	**Recommended Ratio (Item: Trainee)**
A.	***Learning Materials***			
1.	TTLM	prepared by the trainer	25	1:25
2.	Electronic Testing & Diagnosis	Love Day G.C	5	1 : 5
3	Electronics a First Course	Owen Bishop	5	1: 5
B.	***Learning Facilities & Infrastructure***			
1.	Library	10 x 12 meter	1rooms	1 : 25
2.	Lecture Room	6 x 7 meter		
3.	Work shop	10 x 8 meter		
C.	***Tools and Equipments***			
1.	Screw drivers	With flat tip and insulated, split proof handle blade in set of blade size 2x60,3x80,4x1oo,6x125,8x150,10x200mm	pcs	1:1
2	Screw drivers	With flat tip and fully insulated, handled with test lamp up to 380v.blade size 3x60mm	pcs	1:1
3	Screw drivers	Off set with Philips tip inset of four pieces with tip no. 1,2,3,4	pcs	1:1

4	Screw drivers	With Philips tip and insulated, split proof handle blade in set of blade size and length of 100,125,200mm	pcs	1:1
5	variable power supply	Single phase or three phase	pcs	1:1
6	step-down transformer	Single phase step dowen from 220v AC to 12v or 9v or 24v DC	PCS	1:1
7	soldering iron/gun de-soldering tools	220V,50Hrz,25,40,60 W 220v,50Hrz,100W 220v,50Hrz,200W	Pcs	1:1
8	signal generator - AF/RF	Single phase 220v AC	pcs	1:1
9	multi-testers (analog/digital	DC voltage range 0.2,20,200,500v AC voltage range 7.5,25,75,230,750v DC current range 0.2,5,10,30Am AC current range 2,20,200Am Ohmmeter 200Ohm,2K ohm,200K ohm,20M ohm	pcs	1:1
10	test jig	Standard	PCS	1:1
11	ESD-free work bench with mirror	Standard	PC	1:1
12	Degaussing	Standard	Pc	1:1
13	RCA Cables/connectors	Standard	Pc	1:1
14	oscilloscope	Single phase ,220v AC	Pc	1:1
15	high-grade magnifying glass with lamp	Single phase ,220v AC	Pc	1:1
16	Flashlight	Standard fo	Pc	1:1
17	cleaning brush	Sponge	Pc	1:1
18	high voltage probe	Single phase ,220v AC	Pc	1:1

Electro technology



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The trainers who developed the curriculum

No	Name	Qualification	Educational background	Region	College	Mobile number	E-mail
1.	Mesfin Cheru Abebe	**B.ED**. In Electrical/Electronics.Techo		A.A	World together Ethiopia	091141933	mesfin.cheru@worldtogether.0r.kr.
2.	Tesfahun Ayalew Denidine	**B.SC -**Applied Electrical/Electronic Technology **M.Sc -**Electronics and comm Eng.		BGRS	Assosa poly TVET	0912132308	tesfugps44@gmial.com
3.	Ayano Assefa Mekebo	**BSc** - Applied Electrical/Electronic.techno **M.Sc** Electrical power Eng.		SNNP	Arbaminch sat. instu.	0920062670	assefahule@gmial.com
4.	Wubishut temesgen Jaleta	**B.Sc** Applied Electrical/Electronic Technology. **M.Sc** - Electrical &comm.T		Sidama	Hawassa poly TVET	0910040962	Wubepg2@gaimale.com
5.	Yohannis fetene Dassalgn	BSc - Applied Electrical/Electronic Technology. **M.Sc**- Electrical & comm.T		ANRS	Kombolcha Poly TVET	0991642905	Yohannesfetene1@gmail.com
6.	Yidnekachew Regassa Hirpa	B.Sc - Applied Electrical/Electronic Technology **M.Sc.** - Electronic & communication Technology		Harari	Harari poly TEVET	0910343909	Yidne888@gmail.com

Group coordinator

No	Name	Qualification	Educational background	Region	College	Mobile number	E-mail
1	Teferi Muleta	B	Soil &water Engineering Mg,t	BG/Assosa	TVET Agency	0913311083	Teferimuleta2013@gmail.com