

# **AUTOMOTIVE MECHANICS**

## **LEVEL – I**



## **CURRICULUM**

**Based on December, 2021 Version 3 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 Automotive Mechanics Level I.

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

## 1. TVET-Program Design

### 1.1. TVET-Program Title: Automotive Mechanics Level I

### 1.2. 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 an Automotive Mechanic Level I with competencies elaborated in the respective OS. Graduates of the program will have the required qualification to work in the Economic infra-structure in the field of Automotive Technology.

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 Use Tools, Equipment and Measuring Instruments, Interpret Working Drawings and Sketches, Perform Bench Work, Apply Automotive Mechanical System Fundamentals, Apply Automotive Electrical System Fundamentals, Test, Charge and Replace Batteries, Perform Periodic Service, Carry out Service Tires and Wheel Balance, and Apply 5S procedures in accordance with the performance criteria and evidence guide described in the OS.

### 1.3. TVET-Program Training Outcomes

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

[EIS AUM1 01 1221](#) Use Tools, Equipment and Measuring Instruments

[EIS AUM1 02 1221](#) Interpret Working Drawings and Sketches

[EIS AUM1 03 1221](#) Perform Bench Work

[EIS AUM1 04 1221](#) Apply Automotive Mechanical System Fundamentals

[EIS AUM1 05 1221](#) Apply Automotive Electrical System Fundamentals

[EIS AUM1 06 1221](#) Test, Charge and Replace Batteries

[EIS AUM1 07 1221](#) Perform Periodic Service

[EIS AUM1 08 1221](#) Carry out Service Tires and Wheel Balance

[EIS AUM1 09 1221](#) Apply 5S procedures

### 1.4. Duration of the TVET-Program

The Program will have duration of 515 **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	Remarks
		Theory	Practical			
1.	Apply 5S procedures	15	15	5	35	
2.	Use Tools, Equipment and Measuring Instruments	20	40	10	70	
3.	Interpret Working Drawings and Sketches	15	20	5	40	
4.	Perform Bench Work	20	30	10	60	
5.	Apply Automotive Mechanical System Fundamentals	20	40	20	80	
6.	Apply Automotive Electrical System Fundamentals	20	30	10	60	
7.	Test, Charge and Replace Batteries	15	20	15	50	
8.	Perform Periodic Service	15	30	15	60	
9.	Carry out Service Tires and Wheel Balance	20	20	20	60	
<b>Total Hours</b>		160	245	110	515	

### 1.5. 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 I.

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.

### 1.6. 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 should have 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)
<a href="#">EIS AUM1 09 1221</a> Apply 5S procedures	<a href="#">EIS AUM1 M01 0322</a> Applying 5S procedures	<ul style="list-style-type: none"> <li>Develop understanding of quality system</li> <li>Sort needed items from unneeded</li> <li>Set workplace in order</li> <li>Shine work area</li> <li>Standardize activities</li> <li>Sustain 5S system</li> </ul>	35
<a href="#">EIS AUM1 01 1221</a> Use Tools, Equipment and Measuring Instruments	<a href="#">EIS AUM1 M02 0322</a> Using Tools, Equipment and Measuring Instruments	<ul style="list-style-type: none"> <li>Prepare for work</li> <li>Carry-out measurements</li> <li>Use tools and equipment</li> <li>Maintain tools and equipment</li> </ul>	70
<a href="#">EIS AUM1 02 1221</a> Interpret Working Drawings and Sketches	<a href="#">EIS AUM1 M03 0322</a> Interpreting Working Drawings and Sketches	<ul style="list-style-type: none"> <li>Identify technical drawing</li> <li>Identify views, standard symbols and lines</li> <li>Interpret technical drawing</li> </ul>	40
<a href="#">EIS AUM1 03 1221</a> Perform Bench Work	<a href="#">EIS AUM1 M04 0322</a> Performing Bench Work	<ul style="list-style-type: none"> <li>Lay-out and mark dimensions/ features on work piece</li> <li>Cut, chip and file flat rectangular and / or round blocks</li> </ul>	60

		<ul style="list-style-type: none"> <li>• Drill, ream and lap holes</li> <li>• Cut threads using tap, stock and die</li> <li>• Off-hand grind cutting tools</li> <li>• Scrape and hone holes</li> </ul>	
<a href="#">EIS AUM1 04 1221</a> Apply Automotive Mechanical System Fundamentals	<a href="#">EIS AUM1 M05 0322</a> Applying Automotive Mechanical System Fundamentals	<ul style="list-style-type: none"> <li>• Identify system fundamentals</li> <li>• Identify operation of system or component</li> <li>• Locate system or component on vehicle</li> </ul>	80
<a href="#">EIS AUM1 05 1221</a> Apply Automotive Electrical System Fundamentals	<a href="#">EIS AUM1 M06 0322</a> Applying Automotive Electrical System Fundamentals	<ul style="list-style-type: none"> <li>• Identify and apply electrical/electronic fundamentals</li> <li>• identify systems components and apply WHS</li> <li>• Locate systems and components</li> <li>• Determine method of system or component operation</li> </ul>	60
<a href="#">EIS AUM1 06 1221</a> Test, Charge and Replace Batteries	<a href="#">EIS AUM1 M07 0322</a> Testing, Charge and Replace Batteries	<ul style="list-style-type: none"> <li>• Prepare to test and inspect battery</li> <li>• Test and service battery</li> <li>• Charge battery</li> <li>• Carry out jump-start procedures to vehicle</li> <li>• Remove and replace battery</li> <li>• Retest battery</li> <li>• Prepare vehicle and equipment for delivery to customer after battery is replaced</li> </ul>	50

<a href="#">EIS AUM1 07 1221</a> Perform Periodic Service	<a href="#">EIS AUM1 M08 0322</a> Performing Periodic Service	<ul style="list-style-type: none"> <li>• Prepare for work</li> <li>• select lubricants/ coolants</li> <li>• Apply lubricants/ coolant</li> <li>• Carry-out service and Maintenance activities</li> <li>• Perform housekeeping activities</li> </ul>	60
<a href="#">EIS AUM1 08 1221</a> Carry out Service Tires and Wheel Balance	<a href="#">EIS AUM1 M09 0322</a> Carrying out Tires Service and Wheel Balance	<ul style="list-style-type: none"> <li>• Prepare to remove, repair and fit tires, tubes balance and wheels and tires</li> <li>• Remove tyre from rim Conduct inspection and analyze results</li> <li>• Repair tires and tubes</li> <li>• Fit tyres and tubes Prepare equipment for customer and/or storage</li> <li>• Prepare tyre and tube assembly for use or storage</li> </ul>	60

\*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* is 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 Trainers Profile

The trainers conducting this particular TVET Program are B Level and above who have satisfactory practical experiences or equivalent qualifications.

LEARNING MODULE 01	
<b>TVET-PROGRAMME TITLE:</b>	Automotive Mechanics Level I
<b>MODULE TITLE :</b>	Applying 5S Procedures
<b>MODULE CODE :</b>	<a href="#"><u>EIS AUM1 M01 0322</u></a>
<b>NOMINAL DURATION :</b>	35 Hours
<b>MODULE DESCRIPTION :</b> This module cover the skills, attitudes and knowledge required by an employee or worker to apply 5S procedures (structured approach to housekeeping) to their own job and work area and maintains the housekeeping and other standards set by 5S. The module assumes the employee or worker has a particular job and an allocated work area and that processes in the work area are known by the individual.	
<b>LEARNING OUTCOMES</b> At the end of the module the trainee will be able to: <b>LO1.</b> Develop understanding of quality system <b>LO2.</b> Sort needed items from unneeded <b>LO3.</b> Set workplace in order <b>LO4.</b> Shine work area <b>LO5.</b> Standardize activities <b>LO6.</b> Sustain 5s system	
<b>MODULE CONTENTS:</b> <b>LO1. Develop understanding of quality system</b> <ul style="list-style-type: none"> <li>1.1. Understanding quality system and continuous improvement</li> <li>1.2 Elements of quality assurance (QA)               <ul style="list-style-type: none"> <li>1.2.1 Corrective action</li> <li>1.2.2 Monitoring procedures</li> <li>1.2.3 Standard Operating Procedure (SOPs)</li> <li>1.2.4 PDCA concept</li> </ul> </li> <li>1.3 Benefit of KAIZEN</li> <li>1.4 Explaining '5S' system               <ul style="list-style-type: none"> <li>1.4.1 Sort</li> <li>1.4.2 Set in order</li> <li>1.4.3 Shine</li> <li>1.4.4 Standardize</li> <li>1.4.5 Sustain</li> </ul> </li> </ul> <b>LO2. Sort needed items from unneeded</b> <ul style="list-style-type: none"> <li>2.1. Techniques of identifying necessary and unnecessary items</li> <li>2.2. Categorizing unnecessary items               <ul style="list-style-type: none"> <li>2.2.1. Re-Using</li> </ul> </li> </ul>	

**2.2.2. Re-Cycling**

**2.2.3. Disposing and waste management**

**2.3. Housekeeping Techniques and Strategy**

**LO3. Set workplace in order**

**3.1. Location selection methods for essential and non-essential items**

**3.2. Methods of evaluating assigned location**

**3.3. Strategies of set in order**

**3.3.1. Visual Control**

**3.3.2. Motion Economy**

**LO4.Shine Work Area**

**4.1 Benefit of Shine**

**4.2 Shining techniques of work area**

**4.3 Tools and equipment for shine activities**

**4.4 Schedule daily/weekly activities**

**LO5.Standardize Activities**

**5.1. Purpose and Benefits of Standardize**

**5.2. Standard for set in order and shine**

**LO6.Sustain 5S system**

**6.1. Techniques of Sustain 5S**

**6.2. Planning Stage**

**6.3. 5S Organizational Structure**

**6.4. Method of evaluating current condition and taking action**

**6.5. Strategy of continuous improvement sustainability**

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

<b>Demonstration</b>	<ul style="list-style-type: none"> <li>❖ Conduct close follow up</li> <li>❖ Use verbal description</li> <li>❖ Provide special attention in the process of guidance</li> <li>❖ facilitate the support of peer trainees</li> <li>❖ Prepare &amp; use simulation</li> </ul>	<ul style="list-style-type: none"> <li>❖ use Sign language interpreter</li> <li>❖ Use video recorded material</li> <li>❖ Ensure attention of the trainees</li> <li>❖ Provide structured training</li> <li>❖ Show clear and short method</li> <li>❖ Use gesture</li> <li>❖ Provide tutorial support (If necessary)</li> </ul>	<ul style="list-style-type: none"> <li>❖ Illustrate in clear &amp; short method</li> <li>❖ Use Video recorded material</li> <li>❖ Ensure the attention of the trainees</li> <li>❖ Provide tutorial support (If necessary)</li> </ul>	<ul style="list-style-type: none"> <li>❖ Facilitate and support the trainees having severe upper limbs impairment to operate equipment's/ machines</li> <li>❖ Assign peer trainees to assist</li> <li>❖ Conduct close follow up</li> <li>❖ Provide tutorial support (If necessary)</li> </ul>
<b>Group discussion</b>	<ul style="list-style-type: none"> <li>❖ Facilitate the integration of trainees with group members</li> <li>❖ Conduct close follow up</li> <li>❖ Introduce the trainees with another group member</li> <li>❖ Brief the thematic issues of the work</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use sign language interpreters</li> <li>❖ Facilitate the integration of trainees with group members</li> <li>❖ Conduct close follow up</li> <li>❖ Introduce the trainees with another group member</li> </ul>	<ul style="list-style-type: none"> <li>❖ Facilitate the integration of trainees with group members</li> <li>❖ Conduct close follow up</li> <li>❖ Introduce the trainees with another group member</li> <li>❖ Inform the group members to speak loudly</li> </ul>	<ul style="list-style-type: none"> <li>❖ Introduce the trainees with their peers</li> </ul>

<b>Exercise</b>	<ul style="list-style-type: none"> <li>❖ Conduct close follow up and guidance</li> <li>❖ Provide tutorial support if necessary</li> <li>❖ provide special attention in the process</li> </ul>	<ul style="list-style-type: none"> <li>❖ Conduct close follow up and guidance</li> <li>❖ Provide tutorial support if necessary</li> <li>❖ provide special attention in the process/practical training</li> <li>❖ Introduce new and relevant vocabularies</li> </ul>	<ul style="list-style-type: none"> <li>❖ Conduct close follow up and guidance</li> <li>❖ Provide tutorial support if necessary</li> <li>❖ provide special attention in the process/ practical training</li> </ul>	<ul style="list-style-type: none"> <li>❖ Assign peer trainees</li> <li>❖ Use additional nominal hours if necessary</li> </ul>
<b>Individual assignment</b>	<ul style="list-style-type: none"> <li>❖ prepare the assignment questions in large text</li> <li>❖ Encourage the trainees to prepare and submit the assignment in large texts</li> <li>❖ Make available recorded assignment questions</li> <li>❖ Facilitate the trainees to prepare and submit the assignment in soft or hard copy</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use sign language interpreter</li> <li>❖ Provide briefing /orientation on the assignment</li> <li>❖ Provide visual recorded material</li> </ul>	<ul style="list-style-type: none"> <li>❖ Provide briefing /orientation on the assignment</li> <li>❖ Provide visual recorded material</li> </ul>	

ASSESSMENT METHODS:				
<b>Interview</b>		<ul style="list-style-type: none"> <li>❖ Use sign language interpreter</li> <li>❖ Ensure or conform whether the proper communication was conducted with the trainee through the service of the sign language interpreter</li> <li>❖ Use short and clear questioning</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Speak loudly</li> <li>❖ Using sign language interpreter if necessary</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use written response as an option for the trainees having speech challenges</li> </ul>
<b>Written test</b>	<ul style="list-style-type: none"> <li>❖ Prepare the exam in large texts</li> <li>❖ Use interview as an option if necessary</li> <li>❖ Prepare the exam in audio format</li> <li>❖ Assign human reader</li> <li>❖ (If necessary)</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Prepare the exam using short sentences, multiple choices, True or False, matching and short answers</li> <li>❖ Avoid essay writing</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Prepare the exam using short sentences, multiple choices, true or false, matching and short answers if necessary.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use oral response as an option to give answer for trainees having severe upper limb impairment</li> <li>❖ Time extension for trainees having severe upper limb impairment</li> </ul>
<b>Demonstration/ Observation</b>	<ul style="list-style-type: none"> <li>❖ Brief the instruction or provide them in large text</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use sign language interpreter</li> <li>❖ Brief on the instruction of the exam</li> <li>❖ Provide activity-based/ practical assessment method</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Provide activity-based assessment</li> <li>❖ Brief on the instruction of the exam</li> <li>❖ Use loud voice</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Provide activity-based assessment</li> <li>❖ Conduct close follow up</li> <li>❖ Time extension</li> </ul>

## **ASSESSMENT CRITERIA:**

### **LO.1 Develop understanding of quality system**

- Discuss quality assurance procedures of the enterprise or organization
- Understand the relationship of quality system and continuous improvement in the workplace
- Identify and relate to workplace requirements the purpose and elements of quality assurance (QA) system
- Explain the 5S system as part of the quality assurance of the work organization

### **LO.2 Sort needed items from unneeded**

- Identify all items in the work area
- Distinguish between essential and non-essential items
- Sort items to achieve deliverables and value expected by downstream and final customers
- Sort items required for regulatory or other required purposes
- Place any non-essential item in a appropriate place other than the workplace
- Regularly check that only essential items are in the work area

### **LO.3 Set workplace in order**

- Identify the best location for each essential item
- Place each essential item in its assigned location
- After use immediately return each essential item to its assigned location
- Regularly check that each essential item is in its assigned location

### **LO.4 Shine work area**

- Keep the work area clean and tidy at all times
- Conduct regular housekeeping activities during shift
- Ensure the work area is neat, clean and tidy at both beginning and end of shift

### **LO.5 Standardize activities**

- Follow procedures
- Follow checklists for activities, where available
- Keep the work area to specified standard

### **LO.5 Sustain 5S system**

- Clean up after completion of job and before commencing next job or end of shift
- Identify situations where compliance to standards is unlikely and take actions

specified in procedures

- Inspect work area regularly for compliance to specified standard
- Recommend improvements to lift the level of compliance in the workplace

## Annex: Resource Requirements

<u>EIS AUM1 M01 0322</u>		Applying 5S Procedures		
Item No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
<b>A.</b>	<b><i>Learning Materials</i></b>			
1.	TTLM	Prepared by ministry of labor and skill	25 Pcs	1:1
2.	Reference Books			
2.1	Kaizen book	Suzanna Lee	5 Pcs	1:5
<b>B.</b>	<b><i>Learning Facilities &amp; Infrastructure</i></b>			
1.	Class room	31.5 m <sup>2</sup>	1 Pcs	1:25
2.	Whiteboard/Blackboard	240 x 120 cm	1 Pcs	1:25
3.	Arm Chair	55 X 100 x 70	25 Pcs	1:1
4.	Workshop	100 m <sup>2</sup>	1 Pcs	1:25
5.	LCD	Used to display	1 Pcs	1:25
6.	Laptop or Computer	32-bit OS; 3 GB RAM; Intel core i5 (Processor)	1 Pcs	1:25
7.	Library	Per section 105 – 180 m <sup>2</sup>	180 m <sup>2</sup>	1:5
8.	Printer	Laser type	1 unit	1:25
9.	Photocopier	Non-colored	1 unit	1:25
<b>C.</b>	<b><i>Consumable Materials</i></b>			
1.	Printer toner/ink	Compatible with the existing printer	5 pcs	1:25
2.	Photocopier ink/toner	Compatible with the existing printer	1 Pcs	1:25
3.	CD/DVD	RW	5 pcs	1:25
4.	Paper	A4 80gms	5 reams	1:25
5.	Dose	Blue ,green, yellow and red	50 pcs	1:25
6.	Bond paper	A4 size; 20 gsm	5 reams	1:25
7.	Flip chart	Sinarline	5 pads	1:25
8.	Colored pens	Blue, red, green and black colors	5 sets	1:25
9.	Candies	Different color	5 pack	1:25

LEARNING MODULE 02	
<b>TVET-PROGRAMME TITLE:</b>	Automotive Mechanics Level I
<b>MODULE TITLE :</b>	Using Tools Equipment and Measuring Instruments
<b>MODULE CODE :</b>	<a href="#">EIS AUM1M02 0322</a>
<b>NOMINAL DURATION :</b>	70 Hours
<b>MODULE DISCRETION:</b> This module covers the knowledge, skills and attitudes required to use basic measuring devices, tools and equipment to carryout workshop activities.	
<b>LEARNING OUTCOMES</b> At the end of the module the trainee will be able to: <b>LO1.</b> Prepare work station <b>LO2.</b> Carry-out measurements <b>LO3.</b> Using tools and equipment <b>LO4.</b> Maintaining tools and equipment	
<b>MODULE CONTENTS:</b> <b>LO1. Prepare work station</b> <ul style="list-style-type: none"> <li>1.1 Making workstation ready</li> <li>1.2 Following Procedures and workshop manuals</li> <li>1.3 Identifying tools and equipment</li> <li>1.4 Preparing testing devices for use</li> <li>1.5 Identifying and marking unsafe or faulty tools and equipment</li> <li>1.6 OHS relation to tools and equipment</li> </ul> <b>LO2. Carry-out measurements</b> <ul style="list-style-type: none"> <li>2.1 Selecting measuring tools</li> <li>2.2 Check and adjust measuring/testing devices</li> <li>2.3 Implementing appropriate measurements procedures               <ul style="list-style-type: none"> <li>2.3.1. Handling measuring instruments without damage</li> <li>2.3.2. Document result</li> </ul> </li> </ul> <b>LO3. Use tools and equipment</b> <ul style="list-style-type: none"> <li>3.1.Tools and equipment               <ul style="list-style-type: none"> <li>3.1.1 Hand tools</li> <li>3.1.2 Generic Mechanic Tools set</li> <li>3.1.3 Power tools</li> <li>3.1.4 Measuring and testing Tools</li> </ul> </li> </ul>	

**3.1.5** Special tools

**3.1.6** Equipment

**3.2.** Electrical measuring device.

**3.3.** Use and observe Personal Protective Equipment (PPE)

**3.4.** Handling tools and equipment

**3.5.** Reporting malfunctions, unplanned or unusual events

**LO4. Maintain tools and equipment**

**4.1.** Undertake Routine maintenance

**4.1.1** Cleaning

**4.2.1** Lubricating

**4.3.1** Tightening

**4.4.1** Simple tool repairs

**4.5.1** Hand sharpening

**4.6.1** Adjustment

**4.2.** Clean equipment and tools

**4.3.** Store tools and equipment safely

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

		❖ Summarize main points		
<b>Demonstration</b>	<ul style="list-style-type: none"> <li>❖ Conduct close follow up</li> <li>❖ Use verbal description</li> <li>❖ Provide special attention in the process of guidance</li> <li>❖ facilitate the support of peer trainees</li> <li>❖ Prepare &amp; use simulation</li> </ul>	<ul style="list-style-type: none"> <li>❖ use Sign language interpreter</li> <li>❖ Use video recorded material</li> <li>❖ Ensure attention of the trainees</li> <li>❖ Provide structured training</li> <li>❖ Show clear and short method</li> <li>❖ Use gesture</li> <li>❖ Provide tutorial support (If necessary)</li> </ul>	<ul style="list-style-type: none"> <li>❖ Illustrate in clear &amp; short method</li> <li>❖ Use Video recorded material</li> <li>❖ Ensure the attention of the trainees</li> <li>❖ Provide tutorial support (If necessary)</li> </ul>	<ul style="list-style-type: none"> <li>❖ Facilitate and support the trainees having severe upper limbs impairment to operate equipment's/ machines</li> <li>❖ Assign peer trainees to assist</li> <li>❖ Conduct close follow up</li> <li>❖ Provide tutorial support (If necessary)</li> </ul>
<b>Group discussion</b>	<ul style="list-style-type: none"> <li>❖ Facilitate the integration of trainees with group members</li> <li>❖ Conduct close follow up</li> <li>❖ Introduce the trainees with another group member</li> <li>❖ Brief the thematic issues of the work</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use sign language interpreters</li> <li>❖ Facilitate the integration of trainees with group members</li> <li>❖ Conduct close follow up</li> <li>❖ Introduce the trainees with another group member</li> </ul>	<ul style="list-style-type: none"> <li>❖ Facilitate the integration of trainees with group members</li> <li>❖ Conduct close follow up</li> <li>❖ Introduce the trainees with another group</li> </ul>	<ul style="list-style-type: none"> <li>❖ Introduce the trainees with their peers</li> </ul>

			member ❖ Inform the group members to speak loudly	
<b>Exercise</b>	<ul style="list-style-type: none"> <li>❖ Conduct close follow up and guidance</li> <li>❖ Provide tutorial support if necessary</li> <li>❖ provide special attention in the process</li> </ul>	<ul style="list-style-type: none"> <li>❖ Conduct close follow up and guidance</li> <li>❖ Provide tutorial support if necessary</li> <li>❖ provide special attention in the process/practical training</li> <li>❖ Introduce new and relevant vocabularies</li> </ul>	<ul style="list-style-type: none"> <li>❖ Conduct close follow up and guidance</li> <li>❖ Provide tutorial support if necessary</li> <li>❖ provide special attention in the process/ practical training</li> </ul>	<ul style="list-style-type: none"> <li>❖ Assign peer trainees</li> <li>❖ Use additional nominal hours if necessary</li> </ul>
<b>Individual assignment</b>	<ul style="list-style-type: none"> <li>❖ prepare the assignment questions in large text</li> <li>❖ Encourage the trainees to prepare and submit the assignment in large texts</li> <li>❖ Make available recorded assignment questions</li> <li>❖ Facilitate the trainees to prepare and submit the assignment in soft or hard copy</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use sign language interpreter</li> <li>❖ Provide briefing /orientation on the assignment</li> <li>❖ Provide visual recorded material</li> </ul>	<ul style="list-style-type: none"> <li>❖ Provide briefing /orientation on the assignment</li> <li>❖ Provide visual recorded material</li> </ul>	

ASSESSMENT METHODS:				
<b>Interview</b>		<ul style="list-style-type: none"> <li>❖ Use sign language interpreter</li> <li>❖ Ensure or confirm whether the proper communication was conducted with the trainee through the service of the sign language interpreter</li> <li>❖ Use short and clear questioning</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Speak loudly</li> <li>❖ Using sign language interpreter if necessary</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use written response as an option for the trainees having speech challenges</li> </ul>
<b>Written test</b>	<ul style="list-style-type: none"> <li>❖ Prepare the exam in large texts</li> <li>❖ Use interview as an option if necessary</li> <li>❖ Prepare the exam in audio format</li> <li>❖ Assign human reader</li> <li>❖ (If necessary)</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Prepare the exam using short sentences, multiple choices, True or False, matching and short answers</li> <li>❖ Avoid essay writing</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Prepare the exam using short sentences, multiple choices, true or false, matching and short answers if necessary.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use oral response as an option to give answer for trainees having severe upper limb impairment</li> <li>❖ Time extension for trainees having severe upper limb impairment</li> </ul>
<b>Demonstration /Observation</b>	<ul style="list-style-type: none"> <li>❖ Brief the instruction or provide them in large text</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use sign language interpreter</li> <li>❖ Brief on the instruction of the</li> </ul>	<ul style="list-style-type: none"> <li>❖ Provide activity-based assessment</li> <li>❖ Brief on the instruction of the exam</li> </ul>	<ul style="list-style-type: none"> <li>❖ Provide activity-based assessment</li> </ul>

	❖ Time extension	<p>exam</p> <p>❖ Provide activity-based/ practical assessment method</p> <p>❖ Time extension</p>	<p>❖ Use loud voice</p> <p>❖ Time extension</p>	<p>❖ Conduct close follow up</p> <p>❖ Time extension</p>
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## **ASSESSMENT CRITERIA:**

### **LO. Prepare work station**

- Workstation is made ready for work activities
- Procedures and information such as workshop manuals and specifications are acquired.
- Methods in identifying tools and equipment are implemented in accordance with workplace procedures and manufacturer specifications.
- Identified/selected testing devices, tools and equipment are checked for functionality and readied for use.
- Unsafe or faulty tools and equipment including measuring tools are identified and marked for repair according to standard company procedure.
- OHS measures and warnings in relation to working with tools and equipment are observed throughout the work operation

### **LO.2 Carry-out measurements**

- Measuring tools are selected in line with job requirements
- Measuring/testing devices are checked and adjusted as needed in accordance with work requirements
- Appropriate method of conducting measurements is implemented in accordance with workplace procedures and manufacturer specifications.
- Measuring instruments are handled without damage and according to procedures
- Measurement results are compared with manufacturer specifications to indicate compliance or non-compliance.
- Results are documented with evidence and supporting information and recommendation(s).

### **LO.3 Use tools and equipment**

- Tools and equipment are used according to tasks undertaken
- All safety procedures in using tools and equipment are observed at all times and appropriate Personal Protective Equipment (PPE) are used
- Tools and equipment are handled without damage and according to procedures
- Malfunctions, unplanned or unusual events are reported to the supervisor

#### **LO.4 Maintain tools and equipment**

- Routine maintenance of tools is undertaken according to standard operational procedures, principles and techniques
- Equipment and tools are cleaned before and after use in accordance with manufacturer's instructions
- Tools and equipment are stored safely in appropriate locations in accordance with manufacturer's specifications or standard operating procedures

## Annex: Resource Requirements

<u>EIS AUM1 M02 0322</u>		Using Tools, Equipment and Measuring Instruments		
Item No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
<b>A.</b>	<b>Learning Materials</b>			
1.	<b>TTLM</b>	Prepared by Ministry of labor and skill	25 Pcs	1:1
2	<b>Reference Books</b>			
3	Automotive technology A Systems Approach 7th Edition	Jack Erjavec Rob Thompson	5 Pcs	1:5
3	Auto motive mechanics 10 <sup>th</sup> edition	William H.Crouse	5 Pcs	1:5
4	Automobile Engineering	G.B.S. NARANG	5 Pcs	1:5
	Automobile engineering	R.K Rajput		
4.	Journals/Publication/Magazines			
<b>B.</b>	<b>Learning Facilities &amp; Infrastructure</b>			
1.	Class room	Standard	1 Pcs	1:25
2.	White board / black board	240mX120m	1 Pcs	1:25
3	Stool chair	55cmX100cmX70cm	1 Pcs	1:1
4.	Work shop	Standard	25 Pcs	1:1
<b>C.</b>	<b>Consumable Materials</b>			
2	Rag	Cotton	5 Pcs	1:5
5	Oil	A2 A3, A4		
6	Thinner	Standard	25 Pcs	1:1
<b>D.</b>	<b>Tools and Equipment</b>			
1	Fire extinguisher	CO <sub>2</sub> foam	5 Pcs	1:5
2	Hand tools	Chrome	25 Pcs	1:1
3	Measuring and testing Tools	Inside, outside	25 Pcs	1:1
4	Generic Mechanic Tools	All in one	25 Pcs	1:1
5	Special tools	Puller, Extractor	5 Pcs	1:5
6	Power tools	220 v portable	5 Pcs	1:5
7	Electrical measurement/device	Standard	5	1:5

LEARNING MODULE 03	
<b>TVET-PROGRAMME TITLE:</b>	Automotive Mechanics Level I
<b>MODULE TITLE :</b>	Interpreting Working Drawings and Sketches
<b>MODULE CODE :</b>	<a href="#"><u>EIS AUM1 M03 0322</u></a>
<b>NOMINAL DURATION :</b>	40 Hours
<b>MODULE DESCRIPTION :</b> This module covers the knowledge, skill and attitude required to read and interpret drawings and sketches. It requires interpretations of standard drawings by using symbols, dimensional tolerances and notations.	
<b>LEARNING OUTCOMES</b> At the end of the module the trainee will be able to: <b>LO1.</b> Identify technical drawing <b>LO2.</b> Identify views, standard symbols and lines <b>LO3.</b> Interpret technical drawing	
<b>MODULE CONTENTS:</b> <b>LO1. Identify technical drawing</b> <ul style="list-style-type: none"> <li>1.1. Introduction to technical drawing</li> <li>1.2. Identifying materials and dimensions</li> <li>1.3. Free hand sketch</li> <li>1.4. Checking and validating drawing</li> </ul> <b>LO2. Identify views, standard symbols and lines</b> <ul style="list-style-type: none"> <li>2.1 Identifying Orthographic and isometric views               <ul style="list-style-type: none"> <li>2.1.1 Perspective</li> <li>2.1.2 Exploded view</li> <li>2.1.3 Hidden view technique</li> </ul> </li> <li>2.2 Identifying and explaining alphabet of lines</li> <li>2.3 Projections codes and symbols               <ul style="list-style-type: none"> <li>2.3.1 First angle projections</li> <li>2.3.2 Third angle projections</li> </ul> </li> </ul> <b>LO3. Interpret technical drawing</b> <ul style="list-style-type: none"> <li>3.1 Recognizing component assembly/object</li> <li>3.2 Interpreting drawing codes and symbols</li> <li>3.3 Interpreting dimensional tolerances               <ul style="list-style-type: none"> <li>3.3.1 General tolerance</li> </ul> </li> </ul>	

**3.3.2** Angular tolerance

**3.3.3** Geometric tolerance

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

<b>Demonstration</b>	<ul style="list-style-type: none"> <li>❖ Conduct close follow up</li> <li>❖ Use verbal description</li> <li>❖ Provide special attention in the process of guidance</li> <li>❖ facilitate the support of peer trainees</li> <li>❖ Prepare &amp; use simulation</li> </ul>	<ul style="list-style-type: none"> <li>❖ use Sign language interpreter</li> <li>❖ Use video recorded material</li> <li>❖ Ensure attention of the trainees</li> <li>❖ Provide structured training</li> <li>❖ Show clear and short method</li> <li>❖ Use gesture</li> <li>❖ Provide tutorial support (If necessary)</li> </ul>	<ul style="list-style-type: none"> <li>❖ Illustrate in clear &amp; short method</li> <li>❖ Use Video recorded material</li> <li>❖ Ensure the attention of the trainees</li> <li>❖ Provide tutorial support (If necessary)</li> </ul>	<ul style="list-style-type: none"> <li>❖ Facilitate and support the trainees having severe upper limbs impairment to operate equipment's/ machines</li> <li>❖ Assign peer trainees to assist</li> <li>❖ Conduct close follow up</li> <li>❖ Provide tutorial support (If necessary)</li> </ul>
<b>Group discussion</b>	<ul style="list-style-type: none"> <li>❖ Facilitate the integration of trainees with group members</li> <li>❖ Conduct close follow up</li> <li>❖ Introduce the trainees with another group member</li> <li>❖ Brief the thematic issues of the work</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use sign language interpreters</li> <li>❖ Facilitate the integration of trainees with group members</li> <li>❖ Conduct close follow up</li> <li>❖ Introduce the trainees with another group member</li> </ul>	<ul style="list-style-type: none"> <li>❖ Facilitate the integration of trainees with group members</li> <li>❖ Conduct close follow up</li> <li>❖ Introduce the trainees with another group member</li> <li>❖ Inform the group members to speak loudly</li> </ul>	<ul style="list-style-type: none"> <li>❖ Introduce the trainees with their peers</li> </ul>

<b>Exercise</b>	<ul style="list-style-type: none"> <li>❖ Conduct close follow up and guidance</li> <li>❖ Provide tutorial support if necessary</li> <li>❖ provide special attention in the process</li> </ul>	<ul style="list-style-type: none"> <li>❖ Conduct close follow up and guidance</li> <li>❖ Provide tutorial support if necessary</li> <li>❖ provide special attention in the process/practical training</li> <li>❖ Introduce new and relevant vocabularies</li> </ul>	<ul style="list-style-type: none"> <li>❖ Conduct close follow up and guidance</li> <li>❖ Provide tutorial support if necessary</li> <li>❖ provide special attention in the process/ practical training</li> </ul>	<ul style="list-style-type: none"> <li>❖ Assign peer trainees</li> <li>❖ Use additional nominal hours if necessary</li> </ul>
<b>Individual assignment</b>	<ul style="list-style-type: none"> <li>❖ prepare the assignment questions in large text</li> <li>❖ Encourage the trainees to prepare and submit the assignment in large texts</li> <li>❖ Make available recorded assignment questions</li> <li>❖ Facilitate the trainees to prepare and submit the assignment in soft or hard copy</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use sign language interpreter</li> <li>❖ Provide briefing /orientation on the assignment</li> <li>❖ Provide visual recorded material</li> </ul>	<ul style="list-style-type: none"> <li>❖ Provide briefing /orientation on the assignment</li> <li>❖ Provide visual recorded material</li> </ul>	

ASSESSMENT METHODS:				
<b>Interview</b>		<ul style="list-style-type: none"> <li>❖ Use sign language interpreter</li> <li>❖ Ensure or conform whether the proper communication was conducted with the trainee through the service of the sign language interpreter</li> <li>❖ Use short and clear questioning</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Speak loudly</li> <li>❖ Using sign language interpreter if necessary</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use written response as an option for the trainees having speech challenges</li> </ul>
<b>Written test</b>	<ul style="list-style-type: none"> <li>❖ Prepare the exam in large texts</li> <li>❖ Use interview as an option if necessary</li> <li>❖ Prepare the exam in audio format</li> <li>❖ Assign human reader</li> <li>❖ (If necessary)</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Prepare the exam using short sentences, multiple choices, True or False, matching and short answers</li> <li>❖ Avoid essay writing</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Prepare the exam using short sentences, multiple choices, true or false, matching and short answers if necessary.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use oral response as an option to give answer for trainees having severe upper limb impairment</li> <li>❖ Time extension for trainees having severe upper limb impairment</li> </ul>
<b>Demonstration/ Observation</b>	<ul style="list-style-type: none"> <li>❖ Brief the instruction or provide them in large text</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use sign language interpreter</li> <li>❖ Brief on the instruction of the exam</li> <li>❖ Provide activity-based/ practical assessment method</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Provide activity-based assessment</li> <li>❖ Brief on the instruction of the exam</li> <li>❖ Use loud voice</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Provide activity-based assessment</li> <li>❖ Conduct close follow up</li> <li>❖ Time extension</li> </ul>

## **ASSESSMENT CRITERIA:**

### **LO. Identify technical drawing**

- Drawing is checked and validated against job requirements
- Drawing version is checked and validated
- Instructions are confirmed and followed as required

### **LO.2 Identify views, standard symbols and lines**

- Orthographic and isometric drawing are identified
- Orthographic and isometric views are explained
- Alphabet of lines are identified
- Uses of the alphabet of lines are explained
- Projections codes and symbols are correctly identified and explained according to drawing standards

### **LO.3 Interpret technical drawing**

- Component, assembly or object is recognized as required
- Drawing symbols and codes are interpreted appropriately
- Dimensions and material requirements are identified, understood and followed as required
- Dimensional tolerances, notations are interpreted according to specifications



## Annex: Resource Requirements

<u>EIS AUM1 M03 1221</u>		Interpret Working Drawings and Sketches		
Item No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
<b>A.</b>	<b>Learning Materials</b>			
1.	<b>TTLM</b>	Prepared by Ministry of labor and skill	25 Pcs	1:1
2	<b>Reference Books</b>			
3	Basic Technical drawing 6 <sup>th</sup> Edition	Spencer, Henry Cecil, John Thomas	5 Pcs	1:5
3	Textbook of Engineering drawing 6 <sup>th</sup> Edition	David A Madsen	5 Pcs	1:5
4	Engineering drawing Latest Edition	ND Bhatt	5 Pcs	1:5
4.	Journals/Publication/Magazines			
<b>B.</b>	<b>Learning Facilities &amp; Infrastructure</b>			
1.	Drawing room	(4×25) m <sup>2</sup>	1 Pcs	4:1
2.	White board / black board	240m×120m	1 Pcs	1:25
3	Drawing Table	55cm×100cm×70cm	25 Pcs	1:1
4.	Stool chair	35cm×35cm×77cm	25 Pcs	1:1
<b>C.</b>	<b>Consumable Materials</b>			
1	Pencil	HB soft, Graphite, medium	25 Pcs	1:1
2	Masking tape	Standard	5 Pcs	1:5
5	Different types of drawing paper	A2 A3, A4		
6	Eraser or cleaner	Standard	25 Pcs	1:1
<b>D.</b>	<b>Tools and Equipment</b>			
1	Set square, T-square, compass, divider	Standard	25 Pcs	1:1
2	Drawing board	50×35×15 cm	25 Pcs	1:1
3	Drawing Table	Standard	25 Pcs	1:1
4	Paper holder or clips	standard	25 Pcs	1:1

LEARNING MODULE 04	
<b>TVET-PROGRAMME TITLE:</b>	Automotive Mechanics Level I
<b>MODULE TITLE :</b>	Performing Bench Work
<b>MODULE CODE :</b>	<a href="#"><u>EIS AUM1 M04 0322</u></a>
<b>NOMINAL DURATION :</b>	60 Hours
<b>MODULE DESCRIPTION :</b> This module covers the knowledge, skill and attitude required to determine job requirements, perform basic bench work operations (i.e. layout ; cutting with hacksaw and chisel ; filing ; drilling ; tapping etc....) and check the components for conformance to specifications.	
<b>LEARNING OUTCOMES</b> At the end of the module the trainee will be able to: <b>LO1.</b> Lay-out and mark dimensions/ features on work piece <b>LO2.</b> Cut, chip and file flat rectangular and / or round blocks <b>LO3.</b> Drill, ream and lap holes <b>LO4.</b> Cut threads using tap, stock and die <b>LO5.</b> Off-hand grind cutting tools <b>LO6.</b> Scrape and hone holes	
<b>MODULE CONTENTS:</b> <b>LO1. Lay-out and mark dimension/ features on work piece</b> 1.1. Materials and related science 1.2. Selecting materials 1.2.1. Ferrous 1.2.2. Non-Ferrous 1.2.3. Composite materials 1.3. Bench work tools and equipment 1.4. Performing lay out and marking 1.5. Applying safety and personal protective devices <b>LO2. Cut chip and file flat rectangular and / or round blocks</b> 2.1 Methods of clamping work pieces 2.2 Cutting chipping or filing work pieces 2.2.1. Grooves 2.2.2. Slots 2.2.3. Keyways	

### **LO3. Drill ream and lap holes**

**3.1** Perform drilling and reaming

**3.2** Spot-face and lapping Hole

### **LO4. Cut threads using tap stock and die**

**4.1.** Internal thread cutting fit gauge

**4.2.** External thread cutting fit gauge

### **LO5. Off-hand grind cutting tools**

**5.1** Performing grinding and cutting

**5.2** Honing cut edges

**5.3** Sharpening cutter

### **LO6. Scrape and hone holes**

**6.1** Selecting Scrapers

**6.1.1.** Flat surface

**6.1.2.** Curve surface

**6.2** Applying flush agent honing operation

**6.3** Scraping and honing work pieces.

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

<b>Demonstration</b>	<ul style="list-style-type: none"> <li>❖ Conduct close follow up</li> <li>❖ Use verbal description</li> <li>❖ Provide special attention in the process of guidance</li> <li>❖ facilitate the support of peer trainees</li> <li>❖ Prepare &amp; use simulation</li> </ul>	<ul style="list-style-type: none"> <li>❖ use Sign language interpreter</li> <li>❖ Use video recorded material</li> <li>❖ Ensure attention of the trainees</li> <li>❖ Provide structured training</li> <li>❖ Show clear and short method</li> <li>❖ Use gesture</li> <li>❖ Provide tutorial support (If necessary)</li> </ul>	<ul style="list-style-type: none"> <li>❖ Illustrate in clear &amp; short method</li> <li>❖ Use Video recorded material</li> <li>❖ Ensure the attention of the trainees</li> <li>❖ Provide tutorial support (If necessary)</li> </ul>	<ul style="list-style-type: none"> <li>❖ Facilitate and support the trainees having severe upper limbs impairment to operate equipment's/ machines</li> <li>❖ Assign peer trainees to assist</li> <li>❖ Conduct close follow up</li> <li>❖ Provide tutorial support (If necessary)</li> </ul>
<b>Group discussion</b>	<ul style="list-style-type: none"> <li>❖ Facilitate the integration of trainees with group members</li> <li>❖ Conduct close follow up</li> <li>❖ Introduce the trainees with another group member</li> <li>❖ Brief the thematic issues of the work</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use sign language interpreters</li> <li>❖ Facilitate the integration of trainees with group members</li> <li>❖ Conduct close follow up</li> <li>❖ Introduce the trainees with another group member</li> </ul>	<ul style="list-style-type: none"> <li>❖ Facilitate the integration of trainees with group members</li> <li>❖ Conduct close follow up</li> <li>❖ Introduce the trainees with another group member</li> <li>❖ Inform the group members to speak loudly</li> </ul>	<ul style="list-style-type: none"> <li>❖ Introduce the trainees with their peers</li> </ul>

<b>Exercise</b>	<ul style="list-style-type: none"> <li>❖ Conduct close follow up and guidance</li> <li>❖ Provide tutorial support if necessary</li> <li>❖ provide special attention in the process</li> </ul>	<ul style="list-style-type: none"> <li>❖ Conduct close follow up and guidance</li> <li>❖ Provide tutorial support if necessary</li> <li>❖ provide special attention in the process/practical training</li> <li>❖ Introduce new and relevant vocabularies</li> </ul>	<ul style="list-style-type: none"> <li>❖ Conduct close follow up and guidance</li> <li>❖ Provide tutorial support if necessary</li> <li>❖ provide special attention in the process/ practical training</li> </ul>	<ul style="list-style-type: none"> <li>❖ Assign peer trainees</li> <li>❖ Use additional nominal hours if necessary</li> </ul>
<b>Individual assignment</b>	<ul style="list-style-type: none"> <li>❖ prepare the assignment questions in large text</li> <li>❖ Encourage the trainees to prepare and submit the assignment in large texts</li> <li>❖ Make available recorded assignment questions</li> <li>❖ Facilitate the trainees to prepare and submit the assignment in soft or hard copy</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use sign language interpreter</li> <li>❖ Provide briefing /orientation on the assignment</li> <li>❖ Provide visual recorded material</li> </ul>	<ul style="list-style-type: none"> <li>❖ Provide briefing /orientation on the assignment</li> <li>❖ Provide visual recorded material</li> </ul>	

ASSESSMENT METHODS:				
<b>Interview</b>		<ul style="list-style-type: none"> <li>❖ Use sign language interpreter</li> <li>❖ Ensure or conform whether the proper communication was conducted with the trainee through the service of the sign language interpreter</li> <li>❖ Use short and clear questioning</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Speak loudly</li> <li>❖ Using sign language interpreter if necessary</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use written response as an option for the trainees having speech challenges</li> </ul>
<b>Written test</b>	<ul style="list-style-type: none"> <li>❖ Prepare the exam in large texts</li> <li>❖ Use interview as an option if necessary</li> <li>❖ Prepare the exam in audio format</li> <li>❖ Assign human reader</li> <li>❖ (If necessary)</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Prepare the exam using short sentences, multiple choices, True or False, matching and short answers</li> <li>❖ Avoid essay writing</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Prepare the exam using short sentences, multiple choices, true or false, matching and short answers if necessary.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use oral response as an option to give answer for trainees having severe upper limb impairment</li> <li>❖ Time extension for trainees having severe upper limb impairment</li> </ul>
<b>Demonstration/ Observation</b>	<ul style="list-style-type: none"> <li>❖ Brief the instruction or provide them in large text</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use sign language interpreter</li> <li>❖ Brief on the instruction of the exam</li> <li>❖ Provide activity-based/ practical assessment method</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Provide activity-based assessment</li> <li>❖ Brief on the instruction of the exam</li> <li>❖ Use loud voice</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Provide activity-based assessment</li> <li>❖ Conduct close follow up</li> <li>❖ Time extension</li> </ul>

## **ASSESSMENT CRITERIA:**

### **LO. Lay-out and mark dimensions/ features on work piece**

- Materials are selected according to the requirements specified in the drawing.
- Dimensions/features are laid out and marked in accordance with drawing specifications using bench work tools and equipment.
- Lay-outting and marking are performed applying safety procedures and using personal protective devices

### **LO.2 Cut, chip and file flat rectangular and / or round blocks**

- Work pieces are clamped in work holding devices to avoid damage and accidents.
- Work pieces are cut, chipped or filed to within tolerance specified in the drawing.
- Broken or dull hacksaw blades are replaced according to requirements
- Bench work operations are performed applying safety procedures and using personal protective devices.

### **LO.3 Drill, ream and lap holes**

- Hole is drilled, reamed, spot-faced and lapped to drawing specification.
- Drilling, reaming or lapping holes are performed according to recommended sequence.
- Operations are performed applying safety procedures and using personal protective devices.

### **LO.4. Cut threads using tap, stock and die**

- Thread is cut to fit gage or mating screw, within tolerance given in drawing.
- Thread is cut in accordance with the recommended tapping sequence.
- Thread cutting operations are performed applying safety procedures and using personal protective devices.

### **LO.5. Off-hand grind cutting tools**

- Cut edges are honed and free of burrs.
- Cutter is sharpened to conform to specifications.
- Cutters are ground using appropriate cooling agents.
- Cutting tool grinding is performed applying safety procedures and using personal protective devices.

### **LO.6. Scrape and hone holes**

- Scrapers are selected according to requirements of operation.

- Honing flushing agent is selected and applied according requirements of operation.
- Work pieces are scraped and honed according to drawing specifications.



## Annex: Resource Requirements

<u>EIS AUM1 M04 0322</u>		Performing Bench Work		
Item No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
<b>A.</b>	<b><i>Learning Materials</i></b>			
1.	TTLM	Prepared by Ministry of labor and skill	25 Pcs	1:1
2	<b>Reference Books</b>			
2.1	Metal work	5 <sup>th</sup> Edition Herbert Maryon	5 Pcs	1:5
2.2	Welding fundamental	5 <sup>th</sup> Edition William A. Bowditch	5 Pcs	1:5
2.3	Metal work	G,H Thomas	5 Pcs	1:5
4.	Journals/Publication/Magazines			
<b>B.</b>	<b><i>Learning Facilities &amp; Infrastructure</i></b>			
1.	Class Room	Standard	1 Pcs	1:25
2.	White board / black board	240×120m <sup>2</sup>	1 Pcs	1:25
3	<i>Demonstration site</i>	Standard	1 Pcs	1:25
4.	Arm chair	55× 100×70m <sup>2</sup>	25 Pcs	1:1
5	Work shop	Standard	1 Pcs	1:25
<b>C.</b>	<b><i>Consumable Materials</i></b>			
1	Goggles	Standard	25 Pcs	1:1
2	Gloves	Standard	25 Pcs	1:1
5	Aprons/cover coat	Leather	25 Pcs	1:1
6	Stick Electrode	Standard	25 Pcs	1:1
<b>D.</b>	<b><i>Tools and Equipment</i></b>			
1	Drill Press	Standard	5 Set	1:5
2	Vices	Standard	5 Pcs	1:5
3	Pedestal Grinder	Standard	25 Pcs	1:1
4	Layout and marking tools	Standard	25 Pcs	1:1
5	Drills, reamers, laps	Standard	5 Pcs	1:5
6	Thread cutting tools (taps and stock and die)	Standard	5 Pcs	1:5
7	vernier caliper, micrometer,	Standard	Set	1:5
8	Chisels	Standard	Set	1:5
9	Punches	Standard	Set	1:5
10	Welding machine	Standard	5 Pcs	1:5

LEARNING MODULE 05	
<b>TVET-PROGRAMME TITLE:</b>	Automotive Mechanics Level I
<b>MODULE TITLE :</b>	Applying Automotive Mechanical System Fundamentals
<b>MODULE CODE :</b>	<a href="#"><u>EIS AUM1 M05 0322</u></a>
<b>NOMINAL DURATION :</b>	80 hour
<b>MODULE DESCRIPTION :</b> This module covers the knowledge, skill and attitude required to demonstrate basic knowledge and awareness of automotive terminology, terms and principles as they apply to vehicle systems, components and technologies found in modern motor vehicles and also remove and re-install non difficult system components.	
<b>LEARNING OUTCOMES</b> At the end of the module the trainee will be able to: <b>LO1.</b> Identify system fundamentals <b>LO2.</b> Identify operation of system or component <b>LO3.</b> Locate system or component on vehicle <b>LO4.</b> Apply system fundamentals	
<b>MODULE CONTENTS:</b> <b>LO1. Identify system fundamentals</b> 1.1. Basic terminologies of automotive mechanical systems 1.2. Functions and principles of operation 1.3. Identifying sources of information for mechanical system 1.3.1. Vehicle workshop manuals 1.3.2. Automotive texts and technical articles 1.3.3. Written instructions <b>LO2. Identify operation of system/component</b> 2.1 . Automotive mechanical systems and components 2.1.1 Engine systems 2.1.2 Transmissions and drive trains 2.1.3 Steering system 2.1.4 Suspension system 2.1.5 Brake system 2.2 . Identifying safety hazards 2.2.1 Electricity and water 2.2.2 Toxic substances	

**2.2.3** Spillages or damaged equipment

**2.2.4** Flammable materials and fire hazards

**LO3. Locate system or component on vehicle**

**3.1 .** Tracing suitable automotive systems and components

**3.2 .** Confirming location of systems or components

**LO4. Apply system fundamentals**

**4.1** Examining subassembly components

**4.2** Identifying common faults

**4.2.1** Failure to achieve ignition and power

**4.2.2** Failure to achieve fuel flow

**4.2.3** Excessive exhaust smoke or noise

**4.2.4** Unusual engine noises or vibrations

**4.2.5** Excessive play or vibration through steering

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

<b>Demonstration</b>	<ul style="list-style-type: none"> <li>❖ Conduct close follow up</li> <li>❖ Use verbal description</li> <li>❖ Provide special attention in the process of guidance</li> <li>❖ facilitate the support of peer trainees</li> <li>❖ Prepare &amp; use simulation</li> </ul>	<ul style="list-style-type: none"> <li>❖ use Sign language interpreter</li> <li>❖ Use video recorded material</li> <li>❖ Ensure attention of the trainees</li> <li>❖ Provide structured training</li> <li>❖ Show clear and short method</li> <li>❖ Use gesture</li> <li>❖ Provide tutorial support (If necessary)</li> </ul>	<ul style="list-style-type: none"> <li>❖ Illustrate in clear &amp; short method</li> <li>❖ Use Video recorded material</li> <li>❖ Ensure the attention of the trainees</li> <li>❖ Provide tutorial support (If necessary)</li> </ul>	<ul style="list-style-type: none"> <li>❖ Facilitate and support the trainees having severe upper limbs impairment to operate equipment's/ machines</li> <li>❖ Assign peer trainees to assist</li> <li>❖ Conduct close follow up</li> <li>❖ Provide tutorial support (If necessary)</li> </ul>
<b>Group discussion</b>	<ul style="list-style-type: none"> <li>❖ Facilitate the integration of trainees with group members</li> <li>❖ Conduct close follow up</li> <li>❖ Introduce the trainees with another group member</li> <li>❖ Brief the thematic issues of the work</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use sign language interpreters</li> <li>❖ Facilitate the integration of trainees with group members</li> <li>❖ Conduct close follow up</li> <li>❖ Introduce the trainees with another group member</li> </ul>	<ul style="list-style-type: none"> <li>❖ Facilitate the integration of trainees with group members</li> <li>❖ Conduct close follow up</li> <li>❖ Introduce the trainees with another group member</li> <li>❖ Inform the group members to speak loudly</li> </ul>	<ul style="list-style-type: none"> <li>❖ Introduce the trainees with their peers</li> </ul>

<b>Exercise</b>	<ul style="list-style-type: none"> <li>❖ Conduct close follow up and guidance</li> <li>❖ Provide tutorial support if necessary</li> <li>❖ provide special attention in the process</li> </ul>	<ul style="list-style-type: none"> <li>❖ Conduct close follow up and guidance</li> <li>❖ Provide tutorial support if necessary</li> <li>❖ provide special attention in the process/practical training</li> <li>❖ Introduce new and relevant vocabularies</li> </ul>	<ul style="list-style-type: none"> <li>❖ Conduct close follow up and guidance</li> <li>❖ Provide tutorial support if necessary</li> <li>❖ provide special attention in the process/ practical training</li> </ul>	<ul style="list-style-type: none"> <li>❖ Assign peer trainees</li> <li>❖ Use additional nominal hours if necessary</li> </ul>
<b>Individual assignment</b>	<ul style="list-style-type: none"> <li>❖ prepare the assignment questions in large text</li> <li>❖ Encourage the trainees to prepare and submit the assignment in large texts</li> <li>❖ Make available recorded assignment questions</li> <li>❖ Facilitate the trainees to prepare and submit the assignment in soft or hard copy</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use sign language interpreter</li> <li>❖ Provide briefing /orientation on the assignment</li> <li>❖ Provide visual recorded material</li> </ul>	<ul style="list-style-type: none"> <li>❖ Provide briefing /orientation on the assignment</li> <li>❖ Provide visual recorded material</li> </ul>	

ASSESSMENT METHODS:				
<b>Interview</b>		<ul style="list-style-type: none"> <li>❖ Use sign language interpreter</li> <li>❖ Ensure or confirm whether the proper communication was conducted with the trainee through the service of the sign language interpreter</li> <li>❖ Use short and clear questioning</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Speak loudly</li> <li>❖ Using sign language interpreter if necessary</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use written response as an option for the trainees having speech challenges</li> </ul>
<b>Written test</b>	<ul style="list-style-type: none"> <li>❖ Prepare the exam in large texts</li> <li>❖ Use interview as an option if necessary</li> <li>❖ Prepare the exam in audio format</li> <li>❖ Assign human reader</li> <li>❖ (If necessary)</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Prepare the exam using short sentences, multiple choices, True or False, matching and short answers</li> <li>❖ Avoid essay writing</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Prepare the exam using short sentences, multiple choices, true or false, matching and short answers if necessary.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use oral response as an option to give answer for trainees having severe upper limb impairment</li> <li>❖ Time extension for trainees having severe upper limb impairment</li> </ul>
<b>Demonstration/ Observation</b>	<ul style="list-style-type: none"> <li>❖ Brief the instruction or provide them in large text</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use sign language interpreter</li> <li>❖ Brief on the instruction of the exam</li> <li>❖ Provide activity-based/ practical assessment method</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Provide activity-based assessment</li> <li>❖ Brief on the instruction of the exam</li> <li>❖ Use loud voice</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Provide activity-based assessment</li> <li>❖ Conduct close follow up</li> <li>❖ Time extension</li> </ul>

## **ASSESSMENT CRITERIA:**

### **LO.1. Identify system fundamentals**

- Suitable relevant sources of information are located to assist with mechanical fundamentals identified
- General automotive system fundamentals are identified in relation to modern vehicle platforms
- Mechanical/electrical terminology and operating principles of systems and components are referred to and identified for a particular application

### **LO.2. Identify operation of system or component**

- Identify operation of system or component
- Information is researched to ensure sufficient understanding of component or system to assist with its further identification and application
- Potential for unsafe conditions or safety hazards is identified.

### **LO.3. Locate system or component on vehicle**

- Suitable automotive systems and components are sourced to assist with task
- Location of system or component is confirmed in relation to modern vehicle configuration

### **LO.4. Apply system fundamental**

- System or component is examined and sub-assembly components are identified
- Method of operation is determined to confirm principles of system or component function
- System or component relationship to light vehicle operation is determined
- Potential common faults with system or component are identified
- Non difficult system components are removed
- System component are re-installed

## Annex: Resource Requirements

<u>EIS AUM1 M05 0322</u>		Applying Automotive Mechanical System Fundamentals		
Item No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
<b>A.</b>	<b><i>Learning Materials</i></b>			
1.	TTLM	Prepared by ministry of labor and skill	25 Pcs	1:1
2.	Reference Books			
3.1	Automotive Engines	Professor Dr. Alexander A. Stotsky,	5 Pcs	1:5
3.2	Automotive Technology		5 Pcs	1:5
3.3	Automotive Mechanics 10 <sup>th</sup> Edition	William H. Course and Donald L. Anglin	5 Pcs	1:5
3.4	Advanced Automotive Fault Diagnosis Second Edition	Tom Denton 2006	5 Pcs	1:5
3.5	A Field Guide to Automotive Technology	Ed Sobey 2009	5 Pcs	1:5
<b>B.</b>	<b><i>Learning Facilities &amp; Infrastructure</i></b>			
1.	Class room	Standard	1 Pcs	1:25
2.	White board / black board	240mX120m	1 Pcs	1:25
3.	Stool chair	55cmX100cmX70cm	1 Pcs	1:1
<b>C.</b>	<b><i>Consumable Materials</i></b>			
1.	Cotton cloth	Meters	5 Pcs	1:5
2	Diesel fuel	Liters	25L	1:1
5	Gasoline /petrol fuel	Liters	25L	1:1
6	Brake fluids	DOT3, DOT 4 and DOT 5	3L each	1:25
7	Engine oil	SAE 10W- 30 and SAE 15W-40	5L each	1:5
8	Steering Oil	ATF	1L	1:25
9	Lubricants	Oil#10 and 90	5L	1:5
10	Coolants	Antifreeze and Antirust	5L	1:5
<b>D.</b>	<b><i>Tools and Equipment</i></b>			
1	Wrenches	Set	One	1:25
2	Pliers	Set	One	1:25
3	Screw drivers	Set	One	1:25
4	Sockets and accessories	Set	One	1:25
5	Diesel Engine	Four strokes on stand operated	One	1:25
6	Gasoline Engine	Four strokes on stand operated	One	1:25

LEARNING MODULE 06	
<b>TVET-PROGRAMME TITLE:</b>	Automotive Mechanics Level I
<b>MODULE TITLE :</b>	Applying Automotive Electrical System Fundamentals
<b>MODULE CODE :</b>	<a href="#"><u>EIS AUM1 M06 0322</u></a>
<b>NOMINAL DURATION :</b>	60 hrs
<b>MODULE DESCRIPTION :</b> This module covers the knowledge, skill and attitude required to apply basic electricity/electronic as it relates to the electrical systems, components and technologies found in modern motor vehicles.	
<b>LEARNING OUTCOMES</b> At the end of the module the trainee will be able to: <b>LO1.</b> Identify and apply electrical/electronic fundamentals <b>LO2.</b> Identify systems components and apply WHS <b>LO3.</b> Locate systems and components <b>LO4.</b> Determine method of system or component operation	
<b>MODULE CONTENTS:</b> <b>LO1. Identify and apply electrical/electronic fundamentals</b> <ul style="list-style-type: none"> <li>1.1 Basic theory and principles of electricity/electronics</li> <li>1.2 Identifying Common terminology of electricity</li> <li>1.3 Ohms law</li> <li>1.4 Types of Electrical circuits</li> </ul> <b>LO2 Identify systems components and apply WHS</b> <ul style="list-style-type: none"> <li>2.1 Applying WHS requirements</li> <li>2.2 Identifying Components or systems</li> </ul> <b>LO3. Locate systems and components</b> <ul style="list-style-type: none"> <li>3.1 Tracing Suitable automotive systems or components</li> <li>3.2 Identifying Alternative methods of system location</li> </ul> <b>LO4. Determine method of system or component operation</b> <ul style="list-style-type: none"> <li>4.1 Identifying and applying electrical/electronic testing equipment               <ul style="list-style-type: none"> <li>4.1.1. Test lamp</li> <li>4.1.2. Multi meter</li> </ul> </li> <li>4.2. Identifying component sub-assembly</li> <li>4.3. Identifying common faults of circuit</li> </ul>	

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

<b>Demonstration</b>	<ul style="list-style-type: none"> <li>❖ Conduct close follow up</li> <li>❖ Use verbal description</li> <li>❖ Provide special attention in the process of guidance</li> <li>❖ facilitate the support of peer trainees</li> <li>❖ Prepare &amp; use simulation</li> </ul>	<ul style="list-style-type: none"> <li>❖ use Sign language interpreter</li> <li>❖ Use video recorded material</li> <li>❖ Ensure attention of the trainees</li> <li>❖ Provide structured training</li> <li>❖ Show clear and short method</li> <li>❖ Use gesture</li> <li>❖ Provide tutorial support (If necessary)</li> </ul>	<ul style="list-style-type: none"> <li>❖ Illustrate in clear &amp; short method</li> <li>❖ Use Video recorded material</li> <li>❖ Ensure the attention of the trainees</li> <li>❖ Provide tutorial support (If necessary)</li> </ul>	<ul style="list-style-type: none"> <li>❖ Facilitate and support the trainees having severe upper limbs impairment to operate equipment's/ machines</li> <li>❖ Assign peer trainees to assist</li> <li>❖ Conduct close follow up</li> <li>❖ Provide tutorial support (If necessary)</li> </ul>
<b>Group discussion</b>	<ul style="list-style-type: none"> <li>❖ Facilitate the integration of trainees with group members</li> <li>❖ Conduct close follow up</li> <li>❖ Introduce the trainees with another group member</li> <li>❖ Brief the thematic issues of the work</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use sign language interpreters</li> <li>❖ Facilitate the integration of trainees with group members</li> <li>❖ Conduct close follow up</li> <li>❖ Introduce the trainees with another group member</li> </ul>	<ul style="list-style-type: none"> <li>❖ Facilitate the integration of trainees with group members</li> <li>❖ Conduct close follow up</li> <li>❖ Introduce the trainees with another group member</li> <li>❖ Inform the group members to speak loudly</li> </ul>	<ul style="list-style-type: none"> <li>❖ Introduce the trainees with their peers</li> </ul>

<b>Exercise</b>	<ul style="list-style-type: none"> <li>❖ Conduct close follow up and guidance</li> <li>❖ Provide tutorial support if necessary</li> <li>❖ provide special attention in the process</li> </ul>	<ul style="list-style-type: none"> <li>❖ Conduct close follow up and guidance</li> <li>❖ Provide tutorial support if necessary</li> <li>❖ provide special attention in the process/practical training</li> <li>❖ Introduce new and relevant vocabularies</li> </ul>	<ul style="list-style-type: none"> <li>❖ Conduct close follow up and guidance</li> <li>❖ Provide tutorial support if necessary</li> <li>❖ provide special attention in the process/ practical training</li> </ul>	<ul style="list-style-type: none"> <li>❖ Assign peer trainees</li> <li>❖ Use additional nominal hours if necessary</li> </ul>
<b>Individual assignment</b>	<ul style="list-style-type: none"> <li>❖ prepare the assignment questions in large text</li> <li>❖ Encourage the trainees to prepare and submit the assignment in large texts</li> <li>❖ Make available recorded assignment questions</li> <li>❖ Facilitate the trainees to prepare and submit the assignment in soft or hard copy</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use sign language interpreter</li> <li>❖ Provide briefing /orientation on the assignment</li> <li>❖ Provide visual recorded material</li> </ul>	<ul style="list-style-type: none"> <li>❖ Provide briefing /orientation on the assignment</li> <li>❖ Provide visual recorded material</li> </ul>	

ASSESSMENT METHODS:				
Interview		<ul style="list-style-type: none"> <li>❖ Use sign language interpreter</li> <li>❖ Ensure or confirm whether the proper communication was conducted with the trainee through the service of the sign language interpreter</li> <li>❖ Use short and clear questioning</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Speak loudly</li> <li>❖ Using sign language interpreter if necessary</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use written response as an option for the trainees having speech challenges</li> </ul>
Written test	<ul style="list-style-type: none"> <li>❖ Prepare the exam in large texts</li> <li>❖ Use interview as an option if necessary</li> <li>❖ Prepare the exam in audio format</li> <li>❖ Assign human reader</li> <li>❖ (If necessary)</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Prepare the exam using short sentences, multiple choices, True or False, matching and short answers</li> <li>❖ Avoid essay writing</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Prepare the exam using short sentences, multiple choices, true or false, matching and short answers if necessary.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use oral response as an option to give answer for trainees having severe upper limb impairment</li> <li>❖ Time extension for trainees having severe upper limb impairment</li> </ul>
Demonstration/Observation	<ul style="list-style-type: none"> <li>❖ Brief the instruction or provide them in large text</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use sign language interpreter</li> <li>❖ Brief on the instruction of the exam</li> <li>❖ Provide activity-based/ practical assessment method</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Provide activity-based assessment</li> <li>❖ Brief on the instruction of the exam</li> <li>❖ Use loud voice</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Provide activity-based assessment</li> <li>❖ Conduct close follow up</li> <li>❖ Time extension</li> </ul>

## **ASSESSMENT CRITERIA:**

### **LO. Identify and apply electrical/electronic fundamentals**

- Suitable and relevant sources of information are located to assist with electrical fundamentals research.
- Elements of electricity are identified
- Elements of electricity/electronic common terminology are applied to common terminology for automotive electrical circuits, systems and components
- Elements of electricity/electronic are applied to common electrical calculations for automotive electrical circuits, systems and components

### **LO.2 identify systems components and apply WHS**

- Component or system is identified
- Suitable and relevant sources of information are located.
- Reference information is identified
- Potential for unsafe conditions or safety hazards is identified
- Workplace Health and Safety (WHS) requirements are applied

### **LO.3 Locate systems and components**

- Suitable automotive systems or components are sourced to assist with task
- Location of system or component is confirmed in relation to modern vehicle configuration
- Alternative methods of system or component location are identified in relation to possible light vehicle configuration (where applicable)

### **LO4. Determine method of system or component operation**

- Appropriate electrical/electronic test equipment is identified and applied for the purpose of testing circuit diagram, system or component
- System or component is examined and sub-assembly components are identified
- Operational principles of circuit and system functions are determined and analyzed
- System or component relationship to light vehicle operation is determined
- Potential for unsafe conditions or associated risk factors with system or component operation or testing is identified
- Potential common faults with system or component are identified appropriate electrical test equipment is identified and applied for the purpose of testing circuit, system or component

<u>EIS AUM1 06 0322</u>		Applying Automotive Electrical System Fundamentals		
Item No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
<b>A.</b>	<b><i>Learning Materials</i></b>			
1.	TTLM	Prepared by Ministry of labor and skill	25 Pcs	1:1
2	<b>Reference Books</b>			
1	Automobile Electrical and Electronic Systems Third Edition	Tom Denton 2004	5 Pcs	1:5
2	Understanding of Automotive Electronics Fifth Edition	William B. Ribbens, Ph.D.	5 Pcs	1:5
3	Toyota Training Manuals	Prepared by manufacturers and Industry Experts	5 Pcs	1:5
<b>B.</b>	<b><i>Learning Facilities &amp; Infrastructure</i></b>			
1.				
2.	White board / black board	240X120m <sup>2</sup>	1 Pcs	1:25
3				
4.	Arm chair	55X 100X70m <sup>2</sup>	25 Pcs	1:1
5	Store Room	Standard	1 Pcs	1:25
<b>C.</b>	<b><i>Consumable Materials</i></b>			
1	Bulbs	Set (6v&12v) Single and double filament	5 Pcs	1:5
2	Wire	Roll (stranded) 1.5mm	5 Pcs	1:5
3	Soldering wax	Pcs	5 Pcs	1:5
4				
<b>D.</b>	<b><i>Tools and Equipment</i></b>			
1	Soldering gun	Pcs	5 Pcs	1:5
2	Multimeter	Pcs	5 Pcs	1:5

LEARNING MODULE 07	
<b>TVET-PROGRAMME TITLE:</b>	Automotive Mechanics level I
<b>MODULE TITLE :</b>	Testing, Charging and Replacing Batteries
<b>MODULE CODE :</b>	<a href="#">EIS AUM1 M07 0322</a>
<b>NOMINAL DURATION :</b>	50 hours
<b>MODULE DESCRIPTION :</b> This module covers the knowledge, skill and attitude required to test, charge, jump-start, and remove and replace automotive batteries. This module involves identifying and confirming work requirements; preparing for work; servicing, testing and charging batteries; and completing work finalisation processes, including clean-up and documentation.	
<b>LEARNING OUTCOMES</b> At the end of the module the trainee will be able to: <b>LO1.</b> Prepare to test and inspect battery <b>LO2.</b> Test and service battery <b>LO3.</b> Charge battery <b>LO4.</b> Carry out jump-start procedures to vehicle <b>LO5.</b> Remove and replace battery <b>LO6.</b> Retest battery <b>LO7.</b> Prepare vehicle and equipment for delivery to customer after battery is replaced	
<b>MODULE CONTENTS:</b> <b>LO1. Prepare to test and inspect battery</b> <ul style="list-style-type: none"> <li>1.1. Workplace Health and Safety (WHS) requirements               <ul style="list-style-type: none"> <li>1.1.1. Personal protective clothing and equipment</li> <li>1.1.2. Handling of potentially hazardous material and substances</li> <li>1.1.3. First aid</li> </ul> </li> <li>1.2. Principles of electro/chemical Process of Battery</li> <li>1.3. Battery Characteristics and Construction</li> <li>1.4. Battery Rating and code</li> </ul> <b>LO2. Test and service battery</b> <ul style="list-style-type: none"> <li>2.1. Cleaning battery and its compartment</li> <li>2.2. Visual inspection</li> <li>2.3. Battery on-vehicle inspection               <ul style="list-style-type: none"> <li>2.3.1. Load Test</li> </ul> </li> </ul>	

2.3.2. Drain/parasitic Test

2.3.3. Drop test

2.4. Battery testing

2.4.1. Open circuit voltage

2.4.2. Leakage

2.4.3. Specific gravity

2.4.4. Peak-load

### **LO3. Charge battery**

3.1 Determining charging current and time

3.2 Fast Charging

3.3 Slow Charging

### **LO4. Carry out jump-start procedures to vehicle**

4.1 Jump start using another vehicle's battery

4.2 Jump start using battery charger

### **LO5. Remove and replace battery**

5.1 Identifying specifications and measurements

5.2 Principles of Memory of Control units

### **LO6. Retest battery**

6.1 Implementing test methods

6.2 Recording and comparing results with specification

### **LO7. Prepare vehicle and equipment for delivery to customer after battery is replaced**

7.1 Delivering Vehicle to customer

7.2 Processing Workplace documentation

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

<b>Demonstration</b>	<ul style="list-style-type: none"> <li>❖ Conduct close follow up</li> <li>❖ Use verbal description</li> <li>❖ Provide special attention in the process of guidance</li> <li>❖ facilitate the support of peer trainees</li> <li>❖ Prepare &amp; use simulation</li> </ul>	<ul style="list-style-type: none"> <li>❖ use Sign language interpreter</li> <li>❖ Use video recorded material</li> <li>❖ Ensure attention of the trainees</li> <li>❖ Provide structured training</li> <li>❖ Show clear and short method</li> <li>❖ Use gesture</li> <li>❖ Provide tutorial support (If necessary)</li> </ul>	<ul style="list-style-type: none"> <li>❖ Illustrate in clear &amp; short method</li> <li>❖ Use Video recorded material</li> <li>❖ Ensure the attention of the trainees</li> <li>❖ Provide tutorial support (If necessary)</li> </ul>	<ul style="list-style-type: none"> <li>❖ Facilitate and support the trainees having severe upper limbs impairment to operate equipment's/ machines</li> <li>❖ Assign peer trainees to assist</li> <li>❖ Conduct close follow up</li> <li>❖ Provide tutorial support (If necessary)</li> </ul>
<b>Group discussion</b>	<ul style="list-style-type: none"> <li>❖ Facilitate the integration of trainees with group members</li> <li>❖ Conduct close follow up</li> <li>❖ Introduce the trainees with another group member</li> <li>❖ Brief the thematic issues of the work</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use sign language interpreters</li> <li>❖ Facilitate the integration of trainees with group members</li> <li>❖ Conduct close follow up</li> <li>❖ Introduce the trainees with another group member</li> </ul>	<ul style="list-style-type: none"> <li>❖ Facilitate the integration of trainees with group members</li> <li>❖ Conduct close follow up</li> <li>❖ Introduce the trainees with another group member</li> <li>❖ Inform the group members to speak loudly</li> </ul>	<ul style="list-style-type: none"> <li>❖ Introduce the trainees with their peers</li> </ul>

<b>Exercise</b>	<ul style="list-style-type: none"> <li>❖ Conduct close follow up and guidance</li> <li>❖ Provide tutorial support if necessary</li> <li>❖ provide special attention in the process</li> </ul>	<ul style="list-style-type: none"> <li>❖ Conduct close follow up and guidance</li> <li>❖ Provide tutorial support if necessary</li> <li>❖ provide special attention in the process/practical training</li> <li>❖ Introduce new and relevant vocabularies</li> </ul>	<ul style="list-style-type: none"> <li>❖ Conduct close follow up and guidance</li> <li>❖ Provide tutorial support if necessary</li> <li>❖ provide special attention in the process/ practical training</li> </ul>	<ul style="list-style-type: none"> <li>❖ Assign peer trainees</li> <li>❖ Use additional nominal hours if necessary</li> </ul>
<b>Individual assignment</b>	<ul style="list-style-type: none"> <li>❖ prepare the assignment questions in large text</li> <li>❖ Encourage the trainees to prepare and submit the assignment in large texts</li> <li>❖ Make available recorded assignment questions</li> <li>❖ Facilitate the trainees to prepare and submit the assignment in soft or hard copy</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use sign language interpreter</li> <li>❖ Provide briefing /orientation on the assignment</li> <li>❖ Provide visual recorded material</li> </ul>	<ul style="list-style-type: none"> <li>❖ Provide briefing /orientation on the assignment</li> <li>❖ Provide visual recorded material</li> </ul>	

ASSESSMENT METHODS:				
<b>Interview</b>		<ul style="list-style-type: none"> <li>❖ Use sign language interpreter</li> <li>❖ Ensure or confirm whether the proper communication was conducted with the trainee through the service of the sign language interpreter</li> <li>❖ Use short and clear questioning</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Speak loudly</li> <li>❖ Using sign language interpreter if necessary</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use written response as an option for the trainees having speech challenges</li> </ul>
<b>Written test</b>	<ul style="list-style-type: none"> <li>❖ Prepare the exam in large texts</li> <li>❖ Use interview as an option if necessary</li> <li>❖ Prepare the exam in audio format</li> <li>❖ Assign human reader</li> <li>❖ (If necessary)</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Prepare the exam using short sentences, multiple choices, True or False, matching and short answers</li> <li>❖ Avoid essay writing</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Prepare the exam using short sentences, multiple choices, true or false, matching and short answers if necessary.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use oral response as an option to give answer for trainees having severe upper limb impairment</li> <li>❖ Time extension for trainees having severe upper limb impairment</li> </ul>
<b>Demonstration/ Observation</b>	<ul style="list-style-type: none"> <li>❖ Brief the instruction or provide them in large text</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use sign language interpreter</li> <li>❖ Brief on the instruction of the exam</li> <li>❖ Provide activity-based/ practical assessment method</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Provide activity-based assessment</li> <li>❖ Brief on the instruction of the exam</li> <li>❖ Use loud voice</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Provide activity-based assessment</li> <li>❖ Conduct close follow up</li> <li>❖ Time extension</li> </ul>

## **ASSESSMENT CRITERIA:**

### **LO.1 Prepare to test and inspect battery**

- Nature and scope of work requirements are identified and confirmed
- Workplace Health and Safety (WHS) requirements, including individual state and territory regulatory requirements and Personal Protective Equipment (PPE) needs, are observed throughout the work
- Safe operating procedures and information such as site procedures and specifications are sourced
- Technical information is accessed from manufacturer and component supplier specifications and interpreted
- Tools, equipment and materials are identified and prepared
- Warnings in relation to working with batteries are observed

### **LO.2 Test and service battery**

- Service and maintenance methods are carried out according to workplace procedures and manufacturer and component supplier specifications
- Electrolyte levels are checked and topped up where appropriate according to service and maintenance methods
- Batteries and terminals are cleaned according to site procedures
- Battery voltage and load checks are conducted to confirm service repair action Battery is charged, jump-started or replaced

### **LO.3 Charge battery**

- Technical information for charging is accessed from manufacturer and component supplier specifications and is correctly interpreted
- Components, tools and equipment to complete work are identified, selected and prepared according to site procedures
- Electrolyte levels are checked and topped up according to site procedures
- Batteries are charged according to site procedures and component manufacturer and supplier recommendations

### **LO.4 Carry out jump-start procedures to vehicle**

- Technical information is accessed from manufacturer and component suppliers' specifications and is correctly interpreted
- Battery voltage is identified and vehicle and equipment are confirmed as being

appropriate to jump-start procedures

- Leads are connected and disconnected in correct sequence and polarity
- Work is carried out without causing damage to the vehicles involved and equipment being used

#### **LO.5 Remove and replace battery**

- Battery is removed from vehicle according to site procedures, and component manufacturer and supplier recommendations
- Battery is replaced in line with vehicle electrical and physical specifications and measurements
- Correct secure battery fitment is confirmed
- Battery terminals are reconnected and tightened

#### **LO.6 Retest battery**

- Test methods are implemented according to workplace procedures and manufacturer and component supplier specifications
- Test results are compared with manufacturer and component supplier specifications
- Results are documented with evidence, and supporting information is recorded

#### **LO.7 Prepare vehicle and equipment for delivery to customer after battery is replaced**

- Final inspection is made to ensure work is to workplace expectations
- Vehicle is cleaned to workplace expectations and presented ready for use
- Workplace documentation is processed according to workplace procedures

## Annex: Resource Requirements

<u>EIS AUM1 M07 0322</u>		Charging and Replacing Batteries		
Item No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
<b>A.</b>	<b>Learning Materials</b>			
1.	TTLM	Prepared by ministry of labor and skill	5 Pcs	1:5
2.	Reference Books			
3.1	Automobile Electrical and Electronic Systems Third Edition	Tom Denton 2004	5 Pcs	1:5
3.2	Understanding of Automotive Electronics Fifth Edition	William B. Ribbens, Ph.D.	5 Pcs	1:5
4.	Journals/Publication/Magazines			
<b>B.</b>	<b>Learning Facilities &amp; Infrastructure</b>			
1.	White board / black board	240X120m <sup>2</sup>	1 Pcs	1:25
2.	Arm chair	55X 100X70m <sup>2</sup>	25 Pcs	1:1
3.	Work shop	standard	1 Pcs	1:25
<b>C.</b>	<b>Consumable Materials</b>			
1	Rag	Cotton	25 kg	1:1
2	Water	Distilled	50 L	1:5
3	Acid	Sulfuric	10 L	1:5
<b>D.</b>	<b>Tools and Equipment's</b>			
1.	<b>Tools</b>			
	Hydrometer	Ball float type	5 Pcs	1:5
	Cell voltage tester	Standard	5 Pcs	1:5
	Peak load tester	Standard	5 Pcs	1:5
	Multi mater	Automotive	5 Pcs	1:5
	Brush	For battery terminal	5 Pcs	1:5
	Wrench	For battery terminal	5 Pcs	1:5
	Jumper cable	Standard	10 Pcs	1:5
2	<b>Equipment's</b>			
	Bench	(12 x 2) m	5 Pcs	1:5
	Charger	Portable	1 Pcs	1:25
	Apron	Lather	25 Pcs	1:1
	Eye glass	White	25 Pcs	1:1
	Glove	Lather	25 Pcs	1:1
	Mask	NP 95	25 Pcs	1:1

LEARNING MODULE 08	
<b>TVET-PROGRAMME TITLE:</b>	Automotive Mechanics level I
<b>MODULE TITLE :</b>	Performing Periodic Service
<b>MODULE CODE :</b>	<a href="#">EIS AUM1 M08 0322</a>
<b>NOMINAL DURATION :</b>	60 Hours
<b>MODULE DESCRIPTION :</b> This module covers the knowledge, skill and attitude required to carry out, service and maintenance work, selecting and applying different types of lubricants according to manufacturer-related standards and customer needs.	
<b>LEARNING OUTCOMES</b> At the end of the module the trainee will be able to: <b>LO1.</b> Prepare for work <b>LO2.</b> Select lubricants/ coolants <b>LO3.</b> Apply lubricants/ coolant <b>LO4.</b> Carry-out service and Maintenance activities <b>LO5.</b> Perform housekeeping activities	
<b>MODULE CONTENTS:</b> <b>LO1. Prepare for work</b> <ul style="list-style-type: none"> <li>1.1. Overview service and maintenance work plan</li> <li>1.2. Performing inspection</li> <li>1.3. Selecting source of information</li> </ul> <b>LO2. Select lubricants/ coolants</b> <ul style="list-style-type: none"> <li>2.1 Types/Classification of Lubricants</li> <li>2.2 Cause and Effects of Gear Oil Dilution</li> <li>2.3 Maintenance schedule</li> <li>2.4 Identifying lubricants/coolants</li> </ul> <b>LO3. Apply lubricants/ coolant</b> <ul style="list-style-type: none"> <li>3.1 Safe procedure and using PPE</li> <li>3.2 Using correct tools and equipment</li> <li>3.3 Draining and re-filling</li> <li>3.4 Dispose used lubricants</li> </ul>	

**LO4. Carry-out service and Maintenance activities**

**4.1** Identifying Systems/subsystems

**4.2** Following service rules standards and regulations

**4.3** Performing Inspection and replace components

**LO5. Perform housekeeping activities**

**5.1.** Storing Tools, equipment and materials are properly

**5.2.** Keeping workplace

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

<b>Demonstration</b>	<ul style="list-style-type: none"> <li>❖ Conduct close follow up</li> <li>❖ Use verbal description</li> <li>❖ Provide special attention in the process of guidance</li> <li>❖ facilitate the support of peer trainees</li> <li>❖ Prepare &amp; use simulation</li> </ul>	<ul style="list-style-type: none"> <li>❖ use Sign language interpreter</li> <li>❖ Use video recorded material</li> <li>❖ Ensure attention of the trainees</li> <li>❖ Provide structured training</li> <li>❖ Show clear and short method</li> <li>❖ Use gesture</li> <li>❖ Provide tutorial support (If necessary)</li> </ul>	<ul style="list-style-type: none"> <li>❖ Illustrate in clear &amp; short method</li> <li>❖ Use Video recorded material</li> <li>❖ Ensure the attention of the trainees</li> <li>❖ Provide tutorial support (If necessary)</li> </ul>	<ul style="list-style-type: none"> <li>❖ Facilitate and support the trainees having severe upper limbs impairment to operate equipment's/ machines</li> <li>❖ Assign peer trainees to assist</li> <li>❖ Conduct close follow up</li> <li>❖ Provide tutorial support (If necessary)</li> </ul>
<b>Group discussion</b>	<ul style="list-style-type: none"> <li>❖ Facilitate the integration of trainees with group members</li> <li>❖ Conduct close follow up</li> <li>❖ Introduce the trainees with another group member</li> <li>❖ Brief the thematic issues of the work</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use sign language interpreters</li> <li>❖ Facilitate the integration of trainees with group members</li> <li>❖ Conduct close follow up</li> <li>❖ Introduce the trainees with another group member</li> </ul>	<ul style="list-style-type: none"> <li>❖ Facilitate the integration of trainees with group members</li> <li>❖ Conduct close follow up</li> <li>❖ Introduce the trainees with another group member</li> <li>❖ Inform the group members to speak loudly</li> </ul>	<ul style="list-style-type: none"> <li>❖ Introduce the trainees with their peers</li> </ul>

<b>Exercise</b>	<ul style="list-style-type: none"> <li>❖ Conduct close follow up and guidance</li> <li>❖ Provide tutorial support if necessary</li> <li>❖ provide special attention in the process</li> </ul>	<ul style="list-style-type: none"> <li>❖ Conduct close follow up and guidance</li> <li>❖ Provide tutorial support if necessary</li> <li>❖ provide special attention in the process/practical training</li> <li>❖ Introduce new and relevant vocabularies</li> </ul>	<ul style="list-style-type: none"> <li>❖ Conduct close follow up and guidance</li> <li>❖ Provide tutorial support if necessary</li> <li>❖ provide special attention in the process/ practical training</li> </ul>	<ul style="list-style-type: none"> <li>❖ Assign peer trainees</li> <li>❖ Use additional nominal hours if necessary</li> </ul>
<b>Individual assignment</b>	<ul style="list-style-type: none"> <li>❖ prepare the assignment questions in large text</li> <li>❖ Encourage the trainees to prepare and submit the assignment in large texts</li> <li>❖ Make available recorded assignment questions</li> <li>❖ Facilitate the trainees to prepare and submit the assignment in soft or hard copy</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use sign language interpreter</li> <li>❖ Provide briefing /orientation on the assignment</li> <li>❖ Provide visual recorded material</li> </ul>	<ul style="list-style-type: none"> <li>❖ Provide briefing /orientation on the assignment</li> <li>❖ Provide visual recorded material</li> </ul>	

ASSESSMENT METHODS:				
<b>Interview</b>		<ul style="list-style-type: none"> <li>❖ Use sign language interpreter</li> <li>❖ Ensure or conform whether the proper communication was conducted with the trainee through the service of the sign language interpreter</li> <li>❖ Use short and clear questioning</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Speak loudly</li> <li>❖ Using sign language interpreter if necessary</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use written response as an option for the trainees having speech challenges</li> </ul>
<b>Written test</b>	<ul style="list-style-type: none"> <li>❖ Prepare the exam in large texts</li> <li>❖ Use interview as an option if necessary</li> <li>❖ Prepare the exam in audio format</li> <li>❖ Assign human reader</li> <li>❖ (If necessary)</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Prepare the exam using short sentences, multiple choices, True or False, matching and short answers</li> <li>❖ Avoid essay writing</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Prepare the exam using short sentences, multiple choices, true or false, matching and short answers if necessary.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use oral response as an option to give answer for trainees having severe upper limb impairment</li> <li>❖ Time extension for trainees having severe upper limb impairment</li> </ul>
<b>Demonstration/ Observation</b>	<ul style="list-style-type: none"> <li>❖ Brief the instruction or provide them in large text</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use sign language interpreter</li> <li>❖ Brief on the instruction of the exam</li> <li>❖ Provide activity-based/ practical assessment method</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Provide activity-based assessment</li> <li>❖ Brief on the instruction of the exam</li> <li>❖ Use loud voice</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Provide activity-based assessment</li> <li>❖ Conduct close follow up</li> <li>❖ Time extension</li> </ul>

## **ASSESSMENT CRITERIA:**

### **LO.1 Prepare for work**

- Overview about the scope of Service and Maintenance work plan is provided
- Performing inspection systems and components, which present a special risk, are identified.
- Resource of Information are selected by maintenance data, technical documents and service plans
- Possibilities of electronic data processing (diagnostic and testing equipment, Internet) are used

### **LO.2 Select lubricants/ coolants**

- Correct information on lubrication schedule is accessed and interpreted from appropriate manufacturers specifications manuals
- Type and quantity of lubricants/coolants are identified as per job requirements

### **LO.3 Apply lubricants/ coolant**

- Correct procedure for change of lubricant is identified following manufacturer's specification or manuals
- Correct tools and equipment are selected and used in line with job requirements
- Existing lubricants are removed and replaced with specified types and quantity of new materials in line with manufacturer's specification
- Safe procedure and use of PPE are observed when removing or replacing lubricant
- Used lubricants are disposed in accordance with environmental guidelines
- Work is checked in line with company SOP.

### **LO.4 Carry-out service and Maintenance activities**

- Systems, subsystems and functional units are identified
- Description of interaction of systems are carried out
- Internal work order to confirm the order of processing is analysed
- For servicing tools are selected
- Requirements of operating and auxiliary materials and spare parts are identified
- for the service rules, standards and regulations when transporting, lifting and securing the vehicles and systems, are justified
- Inspection is performed by analysing the condition of tear and wear of components

- Components of systems are replaced

**LO.5** Perform housekeeping activities

- Tools, equipment and materials are properly stored as per company SOP
- Workplace is free from waste materials

## Annex: Resource Requirements

<u>EIS AUM1 M08 0322</u>		Performing Periodic Service		
Item No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
<b>A.</b>	<b><i>Learning Materials</i></b>			
1.	TTLM	Prepared by ministry of labor and skill	5 Pcs	1:5
2.	Reference Books			
2.1	Light and Heavy Vehicle Technology	Nunney, M. J., 4th ed., Rutledge, 2007	5 Pcs	1:5
2.2	Automotive Technology: Principles, Diagnosis & Repair, and Service	Halderman, D., 3 <sup>rd</sup> ed., Prentice Hall, 2008.	5 Pcs	1:5
2.3	Automotive Technology: A systems approach	Erjavec, J., 7 <sup>th</sup> ed., Delmar Cengage Learning, 2017	5 Pcs	1:5
4.	Journals/Publication/Magazines			
<b>B.</b>	<b><i>Learning Facilities &amp; Infrastructure</i></b>			
1.	Work shop	For practical 32.4 (m <sup>2</sup> )	1 Pcs	4:1
2.	Work bench	Length x Width x Height (2m x 1.2m x 0.78m)	5 Pcs	1:5
3.	White and/or black board	Length x Height (2.4m x 1.2m)	1 Pcs	1:25
<b>C.</b>	<b><i>Consumable Materials</i></b>			
1	Rag	Cotton	25 kg	1:1
2	Coolant	50/50	25 L	1:5
3	Oil	Engine oil	30 L	1:5
4	Oil	Gear oil	25 L	1:5
5	Brake fluid	Dot 3/ Dot 4	2.5 L	1:5
6	Hydraulic fluid	#10	5 L	1:5
7	Oil	Steering oil	5 L	1:5
8	Grease	Standard	5 kg	1:1
<b>D.</b>	<b><i>Tools and Equipment's</i></b>			
1.	<b><i>Tools</i></b>			
	Oil filter wrench	Belt / chain type	5 Pcs	1:5
	Grease gun	Standard	5 Pcs	1:5
	Hand tools	Mechanic box	5 Pcs	1:5
2	<b><i>Equipments</i></b>			
	Bench	(12 x 2) m	5 Pcs	1:5
	Apron	Lather	25 Pcs	1:1
	Eye glass	White	25 Pcs	1:1
	Glove	Lather	25 Pcs	1:1

LEARNING MODULE 09	
<b>TVET-PROGRAMME TITLE:</b>	Automotive Mechanics Level I
<b>MODULE TITLE :</b>	Carrying out Tire Service and Wheel Balance
<b>MODULE CODE :</b>	<a href="#">EIS AUM1 M09 0322</a>
<b>NOMINAL DURATION :</b>	60 Hours
<b>MODULE DESCRIPTION :</b> This module covers the knowledge, skills and attitude required to carry out minor services in Automotive tire-wheel assembly and conduct wheel balance. The module involves preparing for the task, dismounting and mounting tire-wheel assembly, basic checking/testing to identify fault, repairing tires including tubes, and balancing wheels. Additionally, this module covers performing post-service checks and documentation.	
<b>LEARNING OUTCOMES</b> At the end of the module the trainee will be able to: <b>LO1.</b> Prepare to service tire and balance wheel <b>LO2.</b> Dismount, check/test and remount on wheel <b>LO3.</b> Repair tires and tubes <b>LO4.</b> Perform tire/wheel balance <b>LO5.</b> Replace and Prepare -wheel assembly for use or storage	
<b>MODULE CONTENTS:</b> <b>LO1.</b> Prepare to service tire and wheel balance <ul style="list-style-type: none"> <li>1.1 Fundamentals of automotive tire</li> <li>1.2 Tire construction and classification</li> <li>1.3 Tire Ratings and Designations               <ul style="list-style-type: none"> <li>1.3.1 Tire size information</li> <li>1.3.2 Maximum Cold Inflation pressure and Load</li> <li>1.3.3 Managing Tire inflation pressure</li> </ul> </li> <li>1.4 WHS requirements and Procedures               <ul style="list-style-type: none"> <li>1.4.1 Tire/wheel balance machine safety</li> <li>1.4.2 Tire-Wheel Dismounting and Mounting machine safety</li> </ul> </li> <li>1.5 Identifying and Utilizing Proper Tools and equipment</li> <li>1.6 Sourcing and utilizing workshop manuals and Tire Placard</li> </ul> <b>LO2.</b> Dismount, check/test and remount on wheel <ul style="list-style-type: none"> <li>2.1 Tire Care and tread pattern</li> </ul>	

## 2.2 Removing tire from the Vehicle

## 2.3 Tire-Wheel Assembly Dismounting and Mounting

### 2.3.1 Machine description

### 2.3.2 Dismounting techniques

### 2.3.3 Cleaning disassembled parts

### 2.3.4 Mounting techniques

## 2.4 Checking/testing tire-wheel assembly

### 2.4.1 Tire and tube

### 2.4.2 Wheel and rim

### 2.4.3 TPM System

### 2.4.4 Tire/Wheel Run out

## 2.5 Documentation and reporting results

## LO3. Repair tires and tubes

### 3.1 legal regulations of tire repair

### 3.2 Tire Repair Methods

#### 3.2.1. Plug Repair

#### 3.2.2. Cold Patch Repair

#### 3.2.3. Hot Patch Repair

### 3.3. TPMS Service

### 3.4. Possible damages of Tire-wheel assembly

## LO4. Performing tire/wheel balance

### 4.1 Computer storage system of machine

### 4.2 Inspect rims for damage and wear.

### 4.3 Performing static and dynamic wheel balance

## LO5. Replace and Prepare -wheel assembly for use or storage

### 5.1 Post repair inspection and functionality check

### 5.2 Tire Rotation technique

### 5.3 Tire Recycling

### 5.4 Machine handling

### 5.5 Processing job card and documentation

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

<b>Demonstration</b>	<ul style="list-style-type: none"> <li>❖ Conduct close follow up</li> <li>❖ Use verbal description</li> <li>❖ Provide special attention in the process of guidance</li> <li>❖ facilitate the support of peer trainees</li> <li>❖ Prepare &amp; use simulation</li> </ul>	<ul style="list-style-type: none"> <li>❖ use Sign language interpreter</li> <li>❖ Use video recorded material</li> <li>❖ Ensure attention of the trainees</li> <li>❖ Provide structured training</li> <li>❖ Show clear and short method</li> <li>❖ Use gesture</li> <li>❖ Provide tutorial support (If necessary)</li> </ul>	<ul style="list-style-type: none"> <li>❖ Illustrate in clear &amp; short method</li> <li>❖ Use Video recorded material</li> <li>❖ Ensure the attention of the trainees</li> <li>❖ Provide tutorial support (If necessary)</li> </ul>	<ul style="list-style-type: none"> <li>❖ Facilitate and support the trainees having severe upper limbs impairment to operate equipment's/ machines</li> <li>❖ Assign peer trainees to assist</li> <li>❖ Conduct close follow up</li> <li>❖ Provide tutorial support (If necessary)</li> </ul>
<b>Group discussion</b>	<ul style="list-style-type: none"> <li>❖ Facilitate the integration of trainees with group members</li> <li>❖ Conduct close follow up</li> <li>❖ Introduce the trainees with another group member</li> <li>❖ Brief the thematic issues of the work</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use sign language interpreters</li> <li>❖ Facilitate the integration of trainees with group members</li> <li>❖ Conduct close follow up</li> <li>❖ Introduce the trainees with another group member</li> </ul>	<ul style="list-style-type: none"> <li>❖ Facilitate the integration of trainees with group members</li> <li>❖ Conduct close follow up</li> <li>❖ Introduce the trainees with another group member</li> <li>❖ Inform the group members to speak loudly</li> </ul>	<ul style="list-style-type: none"> <li>❖ Introduce the trainees with their peers</li> </ul>

<b>Exercise</b>	<ul style="list-style-type: none"> <li>❖ Conduct close follow up and guidance</li> <li>❖ Provide tutorial support if necessary</li> <li>❖ provide special attention in the process</li> </ul>	<ul style="list-style-type: none"> <li>❖ Conduct close follow up and guidance</li> <li>❖ Provide tutorial support if necessary</li> <li>❖ provide special attention in the process/practical training</li> <li>❖ Introduce new and relevant vocabularies</li> </ul>	<ul style="list-style-type: none"> <li>❖ Conduct close follow up and guidance</li> <li>❖ Provide tutorial support if necessary</li> <li>❖ provide special attention in the process/ practical training</li> </ul>	<ul style="list-style-type: none"> <li>❖ Assign peer trainees</li> <li>❖ Use additional nominal hours if necessary</li> </ul>
<b>Individual assignment</b>	<ul style="list-style-type: none"> <li>❖ prepare the assignment questions in large text</li> <li>❖ Encourage the trainees to prepare and submit the assignment in large texts</li> <li>❖ Make available recorded assignment questions</li> <li>❖ Facilitate the trainees to prepare and submit the assignment in soft or hard copy</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use sign language interpreter</li> <li>❖ Provide briefing /orientation on the assignment</li> <li>❖ Provide visual recorded material</li> </ul>	<ul style="list-style-type: none"> <li>❖ Provide briefing /orientation on the assignment</li> <li>❖ Provide visual recorded material</li> </ul>	

## ASSESSMENT METHODS:

<b>Interview</b>		<ul style="list-style-type: none"> <li>❖ Use sign language interpreter</li> <li>❖ Ensure or conform whether the proper communication was conducted with the trainee through the service of the sign language interpreter</li> <li>❖ Use short and clear questioning</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Speak loudly</li> <li>❖ Using sign language interpreter if necessary</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use written response as an option for the trainees having speech challenges</li> </ul>
<b>Written test</b>	<ul style="list-style-type: none"> <li>❖ Prepare the exam in large texts</li> <li>❖ Use interview as an option if necessary</li> <li>❖ Prepare the exam in audio format</li> <li>❖ Assign human reader</li> <li>❖ (If necessary)</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Prepare the exam using short sentences, multiple choices, True or False, matching and short answers</li> <li>❖ Avoid essay writing</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Prepare the exam using short sentences, multiple choices, true or false, matching and short answers if necessary.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use oral response as an option to give answer for trainees having severe upper limb impairment</li> <li>❖ Time extension for trainees having severe upper limb impairment</li> </ul>
<b>Demonstration/ Observation</b>	<ul style="list-style-type: none"> <li>❖ Brief the instruction or provide them in large text</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Use sign language interpreter</li> <li>❖ Brief on the instruction of the exam</li> <li>❖ Provide activity-based/ practical assessment method</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Provide activity-based assessment</li> <li>❖ Brief on the instruction of the exam</li> <li>❖ Use loud voice</li> <li>❖ Time extension</li> </ul>	<ul style="list-style-type: none"> <li>❖ Provide activity-based assessment</li> <li>❖ Conduct close follow up</li> <li>❖ Time extension</li> </ul>

## **ASSESSMENT CRITERIA:**

### **LO1. Prepare to service tire and balance wheel**

- Nature and scope of work requirements are identified and confirmed
  - WHS requirements, including individual State/Territory regulatory requirements and personal protection equipment needs are observed throughout the work
  - Procedures and information such as workshop manuals and specifications, and tooling required, are sourced
  - Method options are analysed and those most appropriate to the circumstances are selected and prepared
  - Technical requirements for removal, repair and fitting of tires and tubes are sourced and support equipment is identified and prepare
- Warnings in relation to working with balancing equipment are observed

### **LO2. Dismount, check/test and remount on wheel**

- Methods for the removal are implemented in accordance with workplace procedures and manufacturer/component supplier specifications
- Removal of is carried out in accordance with vehicle/ plant/system manufacturer/component supplier requirements
- is removed without causing damage to any component
- Tire is inspected in readiness for repair
- Tire removal activity is carried out according to industry regulations/guidelines, WHS legislation, legislation and enterprise procedures/policies methods for the inspection are in accordance with workplace procedures and manufacturer/component supplier specifications
- Inspection results are compared with manufacturer/ component supplier specifications to indicate compliance or non-compliance
- Results are documented with evidence and supporting information and recommendation(s) made

Report is processed in accordance with workplace procedures

### **LO3. Repair tires and tubes**

- Methods for the repair are implemented in accordance with workplace procedures and manufacturer/component supplier specifications
- Repair of tire and tube are carried out in accordance with vehicle/plant/system

manufacturer/component supplier requirements

- and tube are repaired without causing damage to any component
  - removal activity is carried out according to industry legal regulations, WHS legislation and enterprise procedures/policies
  - Methods for balancing wheels and tires are implemented in accordance with workplace procedures and manufacturer/component supplier specifications
- Adjustments made during the balancing procedure are in accordance with manufacturer/component supplier specifications

#### **LO4. perform tire/wheel balance**

- Methods for the fitting are implemented in accordance with workplace procedures and manufacturer/component supplier specifications
- and tube are mounted onto rim
- and tube assembly are pressure tested
- Final inspection is made to ensure safety features are in place
- Final inspection is made to ensure work is to workplace expectations
- Tools and Equipment is cleaned for use or storage to workplace expectations
- Job card is processed in accordance with workplace procedures

#### **LO5. Prepare -wheel assembly for use or storage**

- Repair documentation is completed
- Final inspection is made to ensure work is to workplace expectations
- any tube assembly are presented for use or storage to workplace expectations
- Job card is processed in accordance with workplace procedures.

<u>EIS AUM1 M09 0322</u>		Carrying out Tire Service and Wheel Balance		
Item No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
<b>A.</b>	<b>Learning Materials</b>			
1.	TTLM	Prepared by ministry of labor and skill	5 Pcs	1:5
2	Reference and Text books			
2.1	Light and Heavy Vehicle Technology	Nunney, M. J., 4th ed., Rutledge, 2007	5 Pcs	1:5
2.2	Automotive Technology: Principles, Diagnosis & Repair, and Service	Halderman, D., 3 <sup>rd</sup> ed., Prentice Hall, 2008.	5 Pcs	1:5
2.3	Automotive Technology: A systems approach 7 <sup>th</sup> ed.	Erjavec, J., , Delmar Cengage Learning, 2017	5 Pcs	1:5
2.4	Automotive Mechanics 10 <sup>th</sup> ed	Crouse, W.H. and Anglin D.L., McGraw-Hill Companies, 1993.	5 Pcs	1:5
2.5	Automotive Repair and Maintenance	Abrahams, A., Pearson South Africa, 2008.	5 Pcs	1:5
2.5	Service Manuals	(TOYOTA, Nissan)	5 Pcs	1:5
4.	Journals/Publication/Magazines			
<b>B.</b>	<b>Learning Facilities &amp; Infrastructure</b>			
1.	Class room	For lecture in (m <sup>2</sup> )	1 Pcs	6:5
2.	Technical Drawing Room	For drawing (m <sup>2</sup> )	1 Pcs	6:5
3.	Work shop	For practical activity (m <sup>2</sup> )	1 Pcs	4:1
4.	Work bench	Length x Width x Height (2m x 1.2m x 0.78m)	5 Pcs	1:5
5.	White and/or black board	Length x Height (2.4m x 1.2m)	1 Pcs	1:25
6.	Arm chair	Length x Width x Height (1m x 0.55m x 0.74m)	25 Pcs	1:1
7.	Chair (for trainer)	Length x Width x Height (0.4m x 0.56m x 0.78m)	1 Pcs	1:25
8.	Table	Length x Width x Height (1.2m x 0.8m x 0.74m)	1 Pcs	1:25
9.	Computer	(Desktop/Laptop)	1 Pcs	1:25
10.	LCD Projector		1 Pcs	1:25
<b>C.</b>	<b>Consumable Materials</b>			
1.	Rag	Cotton cloth	5Lit.	1:5
2	Detergent	washing	5Lit.	1:25
5	Coolant	Antifreeze, coolant	5Lit.	1:25
6	Engine Oil	API, ASE	5Lit.	1:25
8	Fuel	Gasoline and diesel	15Lit.	1:25

<b>D.</b>	<b>Tools and Equipment</b>			
	Wrenches	Std	1set	1:5
	Socket and ratchet	Std	1set	1:5
	Vernier caliper	Std	5 Pcs	1:5
	Micro meter	Std	5 Pcs	1:5

### Acknowledgement

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