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MINISTRY OF LABOR AND SKILLS

AUTOMOTIVE MECHANICS LEVEL – III



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 III**.**

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 III

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 Mechanics Level III with competencies elaborated in the respective OS. Graduates of the program will have the required qualification to work in the Industry sector 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_Overhaul Conventional and Electronic Fuel System Components, Perform Engine Tune up, Overhaul Engine, Overhaul clutch and Transmissions, Maintain Final Drive and Drive Lines, Maintain Steering and Suspension System, Maintain Brake Systems and Maintain Two and Three-Wheeler Vehicle Assemblies 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 AUM3 01 1221 Overhaul Conventional and Electronic Fuel System components

EIS AUM3 02 1221 Perform Engine Tune up

EIS AUM3 03 1221 Overhaul Engine

EIS AUM3 04 1221 Overhaul clutch and Transmissions

EIS AUM3 05 1221 Maintain Final Drive and Drive Lines

EIS AUM3 06 1221 Maintain Steering and Suspension System

EIS AUM3 07 1221 Maintain Brake Systems

EIS AUM3 08 1221 Maintain Two and Three-Wheeler Vehicle Assemblies

1.4. Duration of the TVET-Program

The Program will have duration of 540 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.

s.no	Unit competency	TVET Institution training		Cooperative training	Total hours	Remarks
		Theory	Practical			
1.	Overhaul Conventional and Electronic Fuel System Components	20	30	30	80	
2.	Perform Engine Tune up	10	20	10	40	
3.	Overhaul Engine	30	60	30	120	
4.	Overhaul clutch and Transmissions	15	25	20	60	
5.	Maintain Final Drive and Drive Lines	10	20	20	50	
6.	Maintain Steering and Suspension System	10	20	10	40	
7.	Maintain Brake Systems	15	15	20	50	
8.	Maintain Two and Three-Wheeler Vehicle Assemblies	20	40	40	100	
TOTAL HOURS					540	

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 III**.**

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)
EIS AUM3 01 1221 Overhaul Conventional and Electronic Fuel System Components	EIS AUM3 M01 0322 Overhauling Conventional and Electronic Fuel System Components	• Prepare for work • Test conventional fuel system and electronic fuel injection components • Overhaul conventional fuel system and electronic fuel injection • Prepare vehicle/ system for customer hand-over or storage	80
EIS AUM3 02 1221 Perform Engine Tune up	EIS AUM3 M02 0322 Performing Engine Tune up	• Prepare for work • Inspect engine system and its components • Test and the engine system and its components • Fine tune engine system and prepare for final use/hand	40
EIS AUM3 03 1221 Overhaul Engine	EIS AUM3 M03 0322 Overhauling Engine	• Prepare to carry out engine overhaul • Remove, Disassemble and inspect engine components • Overhaul and Reassemble engine	120

				• Test engine operation and prepare for delivery to customer/use	
EIS AUM3 04 1221	Overhaul clutch and Transmissions	EIS AUM3 M04 0322	Overhauling clutch and Transmissions	• Prepare to troubleshoot transmission and clutch system • Troubleshoot transmission and clutch system • Repair transmission and clutch system • Test transmission and clutch system functionality and Prepare vehicle/ equipment for use or storage	60
EIS AUM3 05 1221	Maintain Final Drive and Drive Lines	EIS AUM3 M05 0322	Maintaining Final Drive and Drive Lines	• Prepare to Maintain Final Drive and Drive Lines assemblies • Inspect final drive and drive line assemblies and analyse result • Maintain final drive and drive line assemblies • Prepare vehicle/machine for use or storage	50
EIS AUM3 06 1221	Maintain Steering and Suspension System	EIS AUM3 M06 0322	Maintaining Steering and Suspension System	• plan and prepare for work • Disassemble and Inspect steering and suspension systems components • Maintain and reassemble components	40

				• Reinstall, test and clean up complete work area	
EIS AUM3 07 1221	Maintain Brake Systems	EIS AUM3 M07 0322	Maintaining Brake Systems	• Prepare to Maintain braking system • Remove, disassemble and inspect components • Maintain braking system components • Prepare brake components for use or storage /handover	50
EIS AUM3 08 1221	Maintain Two and Three-Wheeler Vehicle Assemblies	EIS AUM3 M08 0322	Maintaining Two and Three-Wheeler Vehicle Assemblies	• Prepare for work • Remove disassemble inspect two- and three-wheel vehicle system components • Overhauling of two and three-wheeler engine and power train assembly • Make equipment ready for use handover	100

*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 Trainer Profile

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

LEARNING MODULE 01	
TVET-PROGRAMME TITLE:	Automotive Mechanics Level III
MODULE TITLE :	Overhauling Conventional and Electronics Fuel System Components
MODULE CODE :	**EIS AUM3 M01 0322**
NOMINAL DURATION :	80 Hours

MODULE DESCRIPTION : This module covers the knowledge, attitudes and skills required to overhaul conventional and electronically controlled fuel injection system components. The module includes preparation for work, test and overhauling of conventional and EFI system components and completion of work processes.

LEARNING OUTCOMES

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

LO1. Prepare For Work

LO2. Test Conventional Fuel System and Electronic Fuel Injection Components

LO3. Overhaul Conventional Fuel System and Electronic Fuel Injection Components

LO4. Prepare Vehicle/ System for Customer Hand-Over or Storage

MODULE CONTENTS:

LO1. Prepare For Work

1.1. Overview of conventional fuel system/components

1.1.1 Actual and stochiometric Air/Fuel ratio

1.1.2 Principles of carburetion and carburetors

1.1.3 Diesel fuel characteristics

1.1.4 Description and function of Diesel fuel injection

1.2. Introduction to Electronic control and EFI principle

1.3. Types and layout of gasoline EFI

1.3.1 Fuel supply system components

1.3.2 Air Induction system components

1.3.3 Sensors Actuators and ECM

1.4. Types of Electronically controlled Diesel fuel injection system

1.4.1 Electronic Diesel control systems

1.4.2 Common Rail Diesel Injection (CRDI) system

1.4.3 Hydraulically actuated electronically controlled unit injector (HEUI)

1.4.4 Hydraulically actuated electronically controlled Unit Pump (HEUP)

1.5. ECU Sensors and Actuators used in Diesel EFI

1.6. Identifying Calibration Requirements for Tests

1.7. Applying OHS and environmental safety

LO2. Test Conventional Fuel System and Electronic Fuel Injection Components

2.1 Testing Conventional Fuel System

2.2 Basic EFI System Checks/Tests and service precautions

2.3 Idle Speed Checks/Tests

2.4 Techniques to analyze and compare test result within specification

2.5 Utilizing results and supporting evidences for overhauling process

2.6 Documenting results and Reporting

LO3. Overhaul Conventional Fuel System and Electronic Fuel Injection Components

3.1 Access and interpreting manufacturer specifications

3.2 Overhauling conventional fuel system/components

3.2.1. Carburator

3.2.2. Fuel supply pump

3.2.3. Injection pumps (Inline and Distributor)

3.2.4. Diesel fuel Injectors

3.3 Overhauling EFI system/components

3.3.1 High pressure pumps

3.3.2 High pressure Diesel Injectors

3.4 Throttle body and Electronic Throttle Controls

LO4. Prepare Vehicle/ System for Customer Hand-Over or Storage

4.1 Making final inspection protective guards

4.2 Cleaning vehicle fuel system components for hand-over

4.3 Processing Job card

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

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

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

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

ASSESSMENT CRITERIA:

LO.1 Prepare for work

Nature and scope of the work requirements are identified and confirmed.

- Procedures and information such as workshop manuals, specifications and tooling and equipment's are acquired.
- Methods in identifying conventional engine and electronic fuel injection components are applied in accordance with engine working principles and workplace procedures.
- Technical and/or calibration requirements for the testing and overhaul of fuel system are sourced and support equipment is identified and prepared.
- OHS, personal protection needs and warnings in relation to working with fuel system are observed throughout the work.
- Applicable national environmental protection measure/ guidelines for fuel system is sourced and observed throughout the work.

LO.2 Test conventional fuel system and electronic fuel injection components

- Methods for conducting tests on conventional engine fuel system and electronic fuel injection components are implemented in accordance with workplace procedures and manufacturer specifications.
- Test is performed on fuel system components in accordance to manufacture specification
- Test results are compared with manufacturer specifications and indicated compliance or non-compliance in order to verify overhaul.
- Results are documented with evidence and supporting information and recommendations
- Report is forwarded to appropriate persons for action in accordance with workplace procedures.

LO.3 Overhaul conventional fuel

- Information is accessed and interpreted from manufacturer specifications.
- Overhauling of conventional and electronic fuel system components are carried out in accordance with manufacturer specifications.
- Fuel system component overhaul is completed without causing damage to the components or system.

LO.4 Prepare vehicle/ system for customer hand-over or storage

- Final inspection is made to ensure protective guards, safety features and cowlings are in place.
- Final inspection is made to ensure conformance to workplace expectations and standards.
- Vehicle fuel system and/or components are cleaned and made ready for turn-over or storage
- Job card is processed in accordance with workplace procedures.

Annex: Resource Requirements

MODULE TITLE: **Overhauling Conventional and Electronics Fuel System Components**				
MODULE CODE: **EIS AUM3 M01 0322**				
Item No.	**Category/Item**	**Description/ Specifications**	**Quantity**	**Recommended Ratio (Item: Trainee)**
A.	***Learning Materials***			
1.	TTLM	Prepared by Ministry of labor and skills	1Pcs	1:5
2.	Reference Books			
2.1	Automotive technology A Systems Approach 7th Edition	Jack Erjavec Rob Thompson	1 Pcs	1:5
2.2	Auto motive mechanics 10^{th} edition	William H.Crouse	1 Pcs	1:5
2.3	Automobile Engineering	G.B.S. NARANG	1 Pcs	1:5
2.4	Automobile engineering	R.K Rajput	1 Pcs	1:5
2.5	Auto motive mechanics 10^{th} edition	William H.Crouse	1 Pcs	1:5
4.	Journals/Publication/Magazines			
B.	***Learning Facilities & Infrastructure***			
1.	Class room	31.5 m^2	1Pcs	1:25
2.	White board / black board	240mX120m	1 Pcs	1:25
3.	Stool chair	55cmX100cmX70cm	1 Pcs	1:1
4.	Work shop	(4× 25) m^2	1 Pcs	25:1
C.	***Consumable Materials***			
1.	Rag	Cotton	5 meter	1:5
2.	Engine Oil	API, SAE	5 liters	1:25
3.	Fuel	Gasoline	5 liters	1:25
4.	Fuel	Diesel	5 liters	1:25
D.	***Tools and Equipments***			
1.	Fire extinguisher	CO_2, 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	Multi-purpose	5 Pcs	1:5
E.	***Equipment's***			
1.	Injection pump tester	Multi-purpose for inline and rotary	1 Pcs	1:5
2.	Nozzle tester	110 -120 bar	1 Pcs	1:5
3.	Diesel engine (live)	Conventional	2 Pcs	1:5
4.	Gasoline engine (live)	Conventional	2 Pcs	1:5
5.	Gasoline engine (live)	Electronic fuel injection	2 Pcs	1:5
6.	Diesel engine (live)	Electronic fuel injection	2 Pcs	1:5

LEARNING MODULE 02	
TVET-PROGRAMME TITLE:	Automotive Mechanics Level III
MODULE TITLE :	Performing Engine Tune up
MODULE CODE :	**EIS AUM3 M02 0322**
NOMINAL DURATION :	40 Hours

MODULE DESCRIPTION : This module covers the knowledge, attitudes and skills required to carry out engine troubleshoot, adjustment of system components in order to keep the engine performance in good running condition.

LEARNING OUTCOMES

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

LO1. Prepare for Work

LO2. Inspect Engine System and Its Components

LO3. Test And the Engine System and Its Components

LO4. Fine tune engine system and prepare for final use/hand

MODULE CONTENTS:

LO1. Prepare For Work

1.1 Types of engine tune up procedures

1.2 Identifying engine tune up tools and equipment

1.3 Preparing Engine and its systems for tune up

1.4 Adjusting Engine systems

1.4.1. Injection timing

1.4.2. Ignition timing

LO2. Inspect Engine System and Its Components

2.1 .Visual inspection

2.2 Re-checking before installation

2.3 Comparing inspection results

LO3. **Test Engine System and Its Components**

3.1 Performing Engine Tests

3.2 Testing coolant and oil pressure

3.3 Adjusting ignition and fuel system

3.4 Adjusting valve clearance

LO4. Fine tune engine system and prepare for final use/hand

4.1 . Pre - delivery tests

4.2 On-the-road test by certified driver

4.3 . Analyzing results and proposing for delivery

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

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

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

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

ASSESSMENT CRITERIA:

1. **LO.1. Prepare for work**
   - Workstation is made ready for tune up activities
   - Necessary tools, equipment and materials are identified and made ready for use
   - Engine system are checked and made ready for tune up
   - Engine systems, injection, ignition, mechanical system required in setting is positioned as per manufacturer's manual
   - Accuracy in detecting/reading injection timing setting is in accordance to manufacture specification.
   - Injection timing setting is re-checked following instructional manuals

LO.2. Inspect engine system and its components

- Inspect engine system components are re-checked before installation,
- Inspect mechanical system requirement as per manual instruction set-up
- Interpreter inspection result compare with manufacture specification

LO.3 Test and the engine system and its components

- Test of engine system component is performed in accordance to manufacture specification
- Mechanical component adjustment is made as per the manufacture specification for fuel and ignition system
- Tightened parts following torque sequence, pattern and specification in the manual
- Adjustment is made as per the manufacture specification for engine systems

LO4. Fine tune engine system and prepare for final use/hand

- Fine tuning is made for perfect maximum engine performance on engine mechanical system
- On-the-road test of vehicle is done by a certified driver.
- Make the engine ready for use and handover

Annex: Resource Requirements

MODULE TITLE: **Engine tune up**				
MODULE CODE: **EIS AUM3 M02 0322**				
Item No.	**Category/Item**	**Description/ Specifications**	**Quantity**	**Recommended Ratio (Item: Trainee)**
A.	***Learning Materials***			
1.	TTLM	Prepared by Ministry of labor and skills	25 Pcs	1:5
2.	Reference Books			
2.6	Automotive technology A Systems Approach 7th Edition	Jack Erjavec Rob Thompson	1 Pcs	1:5
2.7	Auto motive mechanics 10^{th} edition	William H. Crouse	1 Pcs	1:5
2.8	Automobile Engineering	G.B.S. NARANG	1 Pcs	1:5
2.9	Automobile engineering	R.K Rajput	1 Pcs	1:5
2.10	Auto motive mechanics 10^{th} edition	William H. Crouse	1 Pcs	1:5
4.	Journals/Publication/Magazines			
B.	***Learning Facilities & Infrastructure***			
1.	Class room	31.5 m^2	1Pcs	1:25
2.	White board / black board	240mX120m	1 Pcs	1:25
3.	Stool chair	55cmX100cmX70cm	25 Pcs	1:1
4.	Work shop	(4× 25) m^2	1 Pcs	1:1
C.	***Consumable Materials***			
1.	Rag	Cotton	5 meters	1:5
2.	Engine Oil	API, SAE	5 liters	1:25
3.	Fuel	Gasoline	5 liters	1:25
4.	Fuel	Diesel	5 liters	1:25
D.	***Tools and Equipment's***			
1.	Fire extinguisher	CO_2, 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	Multi-purpose	5 Pcs	1:5
E.	***Equipment's***			
1.	Comp ration tester	Std	2 Pcs	1:5
2.	Leakage tester	Std	2 Pcs	1:5
3.	Taco meter	Std	2 Pcs	1:5
4.	Injection pump tester	Multi-purpose for inline and rotary	1 Pcs	1:5
5.	Diesel engine	Conventional	2 Pcs	1:5
6.	Gasoline engine	Electronic fuel injection	2 Pcs	1:5
7.	Gasoline engine	Conventional	2 Pcs	1:5
8.	Diesel engine	Electronic fuel injection	2 Pcs	1:5

LEARNING MODULE 03	
TVET-PROGRAMME TITLE:	Automotive Mechanics Level III
MODULE TITLE :	Overhauling Engine
MODULE CODE :	**EIS AUM3 M03 0322**
NOMINAL DURATION :	120 Hours

MODULE DESCRIPTION : This module covers the knowledge ; attitudes and skills required to overhaul engines and its components on an engine removed from chassis. The module includes preparation for work; cleaning, inspecting, remove from vehicle and dismantling of parts; measure engine components, recondition/replace, assemble, adjustment and final testing.

LEARNING OUTCOMES

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

LO1. Prepare To Carry Out Engine Overhaul

LO2. Remove, Disassemble and Inspect Engine Components

LO3. Overhaul and Reassemble Engine

LO4. Test Engine Operation and Prepare For Delivery To Customer/Use

MODULE CONTENTS:

LO1. Prepare To Carry Out Engine Overhaul

1.1. Introduction to engine overhauling

1.2. Methods of Engine cleaning

1.3. Applying OHS and environmental protection

1.4. Measuring and special service tools

LO2. Remove, Disassemble and Inspect Engine Components

2.1. Removing Engine from Vehicle

2.2. Cleaning and Inspecting Engine Components

2.3. Analyzing Engine component failure

LO3. Overhaul and Reassemble Engine

3.1. Measuring and checking components

3.2. Accessing and interpreting specification

3.3. Ordering replacement parts and isolating reusable

3.4. Reconditioning Engine upper and lower end parts

3.5. Replacing system parts

3.6. Assembling engine parts and systems

3.6.1 Actuators

3.6.2 Sensors

3.6.3 Attachments and drive mechanisms

LO4. Test Engine Operation and Prepare for Delivery To Customer/Use

4.1 Processing job card

4.2 Mounting Engine on vehicle

4.3 Checking engine fluid levels

4.4 Engine Control Unit faults

4.5 Running Engine for specified period making adjustments

4.6 Run the engine and analyze road test

4.7 Granting technical assurance

4.8 Delivering engine to customer

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

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

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

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

ASSESSMENT CRITERIA:

LO.1 Prepare to carry out engine overhaul

- Nature and scope of work requirements are identified and confirmed.
- OHS requirements and personal protection needs are observed throughout the work.
- Applicable national environmental protection measures are observed throughout the work.
- Technical and tooling requirements for overhaul are identified and support equipment is identified and prepared.

LO.2 Remove, Disassemble and inspect engine components

- Removed Engine from vehicle is cleaned and dismantling of relevant components completed without causing damage to any component or system.
- Engine component is inspected for troubles visually
- (Use inspection technique)
- Components are cleaned for inspection and inspection results are compare against specification
- Engine components failure is analysed using appropriate tools and equipment
- Decisions are made as to serviceability and repair method of each component

LO.3 Overhaul and Reassemble engine

- Measured components checked against specifications and tolerances for reusability or replacement.
- Information is accessed and interpreted from manufacturer specifications and repair methods.
- Replacement parts are ordered /sourced and reusable parts for reconditioning are isolated.
- Carry out Overhaul activities Rebuild, recondition or replacement of engine components in accordance with manufacturer specifications.
- Engine is assembled following manufacturer procedures
- Replaced parts (actuator, sensors) may integrate with systems

LO.4 Test engine operation and prepare for delivery to customer/use

- Engine is securely mounted on the vehicle in preparation for starting.
- Engine fluid levels, including lubrication and coolant and Gauges and warning devices are checked.

- Engine Control units fault memory restored and ECU will be integrated with system.
- Engine is started and run for a specified period.
- Adjustments is made while engine is running
- On-the-road test of engine is done by a certified driver.
- Job card is processed in accordance with workplace procedures.
- Technical assurance will be granted for engine functionality
- The engine is ready for handover/ use

Annex: Resource Requirements

MODULE TITLE: **Overhauling Engine**				
MODULE CODE: **EIS AUM3 M03 0322**				
Item No.	**Category/Item**	**Description/ Specifications**	**Quantity**	**Recommended Ratio (Item: Trainee)**
A.	***Learning Materials***			
1.	TTLM	Prepared by Ministry of labor and skills	25 Pcs	1:5
2.	Reference Books			
2.11	Automotive technology A Systems Approach 7th Edition	Jack Erjavec Rob Thompson	1 Pcs	1:5
2.12	Auto motive mechanics 10^{th} edition	William H. Crouse	1 Pcs	1:5
2.13	Automobile Engineering	G.B.S. NARANG	1 Pcs	1:5
2.14	Automobile engineering	R.K Rajput	1 Pcs	1:5
2.15	Auto motive mechanics 10^{th} edition	William H. Crouse	1 Pcs	1:5
4.	Journals/Publication/Magazines			
B.	***Learning Facilities & Infrastructure***			
5.	Class room	31.5 m^2	1Pcs	1:25
6.	White board / black board	240mX120m	1 Pcs	1:25
7.	Stool chair	55cmX100cmX70cm	1 Pcs	1:1
8.	Work shop	(4× 25) m^2	1Pcs	1:1
C.	***Consumable Materials***			
5.	Rag	Cotton	5 meter	1:5
6.	Engine Oil	API, SAE	5 liters	1:25
7.	Fuel	Gasoline	5 liters	1:25
8.	Fuel	Diesel	5 liters	1:25
D.	***Tools and Equipments***			
8.	Fire extinguisher	CO_2, foam	5 Pcs	1:5
9.	Hand tools	Chrome	25 Pcs	1:1
10.	Measuring and testing Tools	Inside, outside	25 Pcs	1:1

11.	Generic Mechanic Tools	All in one	25 Pcs	1:1
12.	Special tools	Puller, Extractor	5 Pcs	1:5
13.	Power tools	220 v portable	5 Pcs	1:5
14.	Electrical measurement/device	Standard	5 Pcs	1:5
E.	***Equipment's***			
7.	Engine stand	Multi-purpose	1 Pcs	1:5
8.	Engine performance tester	Std	1 Pcs	
9.	Work bench	Std	11 Pcs	1:5
10.	Diesel engine	Conventional 4 cylinder	21 Pcs	1:5
11.	Diesel engine	Electronic fuel injection	21 Pcs	1:5
12.	Gasoline engine	Conventional 4 cylinder	21 Pcs	1:5
13.	Gasoline engine	Electronic fuel injection	21 Pcs	1:5

LEARNING MODULE 04	
TVET-PROGRAMME TITLE:	Automotive Mechanics level III
MODULE TITLE :	Overhauling Clutch and Transmissions
MODULE CODE :	EIS AUM3 M04 0322
NOMINAL DURATION :	60 Hours

MODULE DESCRIPTION : This module covers the knowledge, skill and attitude required to diagnose deviations from correct operation, repair of transmission and clutch system components. It covers Preparation to troubleshoot system, on both manual and automatic transmission and clutch system, repair, analyse results check system functionality and prepare vehicle/ equipment for use or storage.

LEARNING OUTCOMES

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

LO1. Prepare To Troubleshoot Transmission and Clutch System

LO2. Troubleshoot Transmission and Clutch System

LO3. Repair Transmission and Clutch System

LO4. Test Transmission and Clutch System Functionality and Prepare Vehicle/ Equipment For Use Or Storage

MODULE CONTENTS:

LO1. Prepare To Troubleshoot Transmission and Clutch System

1.1 Overview of clutch and transmission

- **1.1.1** Coil and Diaphragm spring clutches
- **1.1.2** Single and multi-disc clutch assemblies
- **1.1.3** Manual transmission and transaxle
- **1.1.4** Transfer case
- **1.1.5** Automatic transmission

1.2 Applying OHS and environmental protection requirements

1.3 Identifying appropriate tools and equipment

LO2. Troubleshoot Transmission and Clutch System

2.1. Troubleshooting techniques

2.2. Diagnosing Clutch and transmission Problems

2.3. Most common Faults of clutch

- **2.3.1.** Clutch slippage
- **2.3.2.** Clutch drag and binding

2.3.3. Clutch chatter

2.3.4. Clutch pedal pulsation

2.3.5. Clutch vibration and noise

2.4. Transmission Visual inspection

2.5. Transmission In Vehicle test

2.5.1. Engine–Off Shift Test

2.5.2. Engine running Shift Test

2.5.3. Road test

2.6. Most common Faults of Transmission

2.6.1. Transmission noise and vibration

2.6.2. Gear jump out

2.6.3. Hard gear shifting

2.6.4. Gear grinding

2.7. Performing troubleshooting

LO3. Repair Transmission and Clutch System

3.1. Clutch linkage adjustment

3.2. Gear shift adjustment

3.3. Fluid change and top up

3.4. Removing Dismantling and inspection

3.5. Repairing, replacement and adjustment

3.6. Re- assemble and installing

LO4. Test Transmission and Clutch System Functionality and Prepare Vehicle/ Equipment for Use or Storage

4.1 Smooth and Noise free run

4.2 Odorless and Leak free

4.3 Easy shift of gears

4.4 Mobile or stationary tests

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

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

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

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

ASSESSMENT CRITERIA:

LO.1 Prepare to troubleshoot transmission and clutch system

- Workplace instructions are used to determine job requirements
- OHS requirements are observed and applied throughout the work
- Procedures and information are sourced and interpreted
- Troubleshoot options are analysed and those most appropriate to the circumstances are selected
- Appropriate tools and equipment are selected and prepared
- Technical and/or calibration requirements for testing of transmission are sourced and support equipment is identified and prepared
- Warnings in relation to working with transmission are observed

LO.2 Troubleshoot transmission and clutch system

- Type of transmission and clutch system are identified
- Troubleshoot are performed according to workplace procedures and without causing damage to components or systems
- Faults are identified from troubleshoot results and causes of faults are determined
- Troubleshoot are reported according to workplace procedures, including recommendations for necessary repairs or adjustments

LO.3 Repair transmission and clutch system

- Repair options are analysed and those most appropriate to the circumstances are selected
- Appropriate tooling, techniques and materials are selected and prepared
- Repairs and component replacements and adjustments are carried out without causing damage to components or systems and according to workplace procedures and manufacturer and component supplier specifications
- Test results are compared with manufacturer/component supplier specifications to indicate compliance or non-compliance

LO.4 Test transmission and clutch system functionality and Prepare vehicle/ equipment for use or storage

- Post-repair testing is carried out according to workplace procedures and relevant

legislation

- Methods for tests are implemented in accordance with workplace procedures and manufacturer/component supplier specifications
- Fault are identified and adjusted
- Results are documented with evidence and supporting information and recommendation(s) made
- Final inspection is made to ensure protective guards, safety features and cowlings are in place
- Report is processed in accordance with workplace procedures work order
- Road/site test is conducted for functionality equipment is ready for use/ hand-over

Annex: Resource Requirements

MODULE TITLE: **Overhauling Clutch and Transmissions**				
MODULE CODE: **EIS AUM3 M04 0322**				
Item No.	**Category/Item**	**Description/ Specifications**	**Quantity**	**Recommended Ratio (Item: Trainee)**
A.	***Learning Materials***			
1.	TTLM	Prepared by Ministry of labor and skills	25 pcs	1:5
2.	Reference Books			
2.1	Automotive technology A Systems Approach 7th Edition	Jack Erjavec Rob Thompson	1 Pcs	1:5
2.2	Auto motive mechanics 10^{th} edition	William H. Crouse	1 Pcs	1:5
2.3	Automobile Engineering	G.B.S. NARANG	1 Pcs	1:5
2.4	Automobile engineering	R.K Rajput	1 Pcs	1:5
2.5	Auto motive mechanics 10^{th} edition	William H. Crouse	1 Pcs	1:5
2.6	Journals/Publication/Magazines			
B.	***Learning Facilities & Infrastructure***			
1.	Class room	31.5 m^2	1Pcs	1:25
2.	White board / black board	240mX120m	1 Pcs	1:25
3.	Stool chair	55cmX100cmX70cm	1 Pcs	1:1
4.	Work shop	(4× 25) m^2	1 Pcs	1:1
C.	***Consumable Materials***			
1.	Rag	Cotton	5 Pcs	1:5
2	Gear oil	API, SAE 90,140	5 liters	1:25
3	Brake fluid	Dot 3, Dot 4	1 liter	1:25
4	Fuel	Diesel, gasoline	15 liters	1:25
D.	***Tools and Equipment's***			
1.	Fire extinguisher	CO_2, 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 Pcs	1:5
E.	***Equipment's***			
1	Engine stand	Multi-purpose	1 Pcs	1:5
2	Work bench	Std	1 Pcs	1:5
3	Diesel engine	Conventional 4stroke	2 Pcs	1:5
4	Diesel engine	Electronic fuel injection 4stroke	2 Pcs	1:5
5	Gasoline Engine	Conventional 4stroke	2 Pcs	1:5
6	Gasoline Engine	Electronic fuel injection 4stroke	2 Pcs	1:5

LEARNING MODULE 05	
TVET-PROGRAMME TITLE:	Automotive Mechanics Level III
MODULE TITLE :	Maintaining Final Drive and Drive Lines
MODULE CODE :	**EIS AUM3 M05 0322**
NOMINAL DURATION :	50 Hours

MODULE DESCRIPTION : This module covers the knowledge, skills and attitude required to maintain final drive and drive lines. The module involves preparation for work, techniques to inspect measure, identify and restore faults and assemble parts in an automotive retail, service and/or repair context and make ready for handover.

LEARNING OUTCOMES

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

LO1. Prepare To Maintain Final Drive and Drive Lines Assemblies

LO2. Inspect Final Drive and Drive Line Assemblies and Analyse Result

LO3. Maintain Final Drive and Drive Line Assemblies

LO4. Prepare Vehicle/Machine for Use or Storage

MODULE CONTENTS:

LO1. Prepare to Maintain Final Drive and Drive Lines assemblies

1.1 Observing WHS requirements

1.2 Sourcing repair manual information

- **1.2.1** Identifying vehicle and parts serial number
- **1.2.2** Repair instructions
- **1.2.3** Observing precautions in repairing final drive

1.3 Identifying test and special service tools

1.4 Selecting appropriate gear oil

1.5 Analyzing customer compliant and confirming symptom chart

1.6 Analyzing repair method options

LO2. Inspect final drive and drive line assemblies and analyse result

2.1 Inspecting Common vibration and noise

2.2 Inspecting Front-Wheel Drive

- **2.2.1** Problem Diagnosis
- **2.2.2** Obtaining CV Repair Parts and FWD Axles
- **2.2.3** CV Joint Service Guidelines

2.3 Inspecting Rear-Wheel Drive Shaft

2.3.1 Drive Shaft Run out

2.3.2 Drive Shaft angles

2.3.3 Drive Shaft balance

2.4 Diagnosis of Final Drivetrain Problems

2.4.1 Gathering Customer compliant

2.4.2 Visual Inspection

2.4.3 Possible Sources of Leaks

2.4.4 Road test

LO3. **Maintain Final Drive and Drive Line Assemblies**

3.1 CV Joint Service

3.1.1 Removing and Replacing a CV Joint Boot

3.1.2 Removing and Replacing FWD Axles

3.2 Disassembling and Reassembling a Single Universal Joint

3.3 Final Drive Assembly Service

3.3.1 Checking and adjusting pinion gear depth/preload.

3.3.2 Measuring and Adjusting Side-Bearing Backlash and Preload

3.3.3 Checking and adjusting gear tooth contact patterns

3.3.4 Disassembling and Reassembling Final Drive Assembly

3.4 Rear axle shaft and bearing Service

3.4.1 Removing and installing Full-floating Axle Shafts

3.4.2 Removing and installing Semi-floating Axle Shafts

3.4.3 Removing and installing Three quarter-floating Axle Shafts

3.4.4 Removing and replacing Axle Shaft Bearings

3.4.5 Removing and replacing Wheel stud

LO4. **Prepare Vehicle/Machine for Use or Storage**

4.1. Completing Maintenance schedule documentation

4.2. Performing post repair inspection and road test

4.3. Cleaning and re-storing vehicle

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

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

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

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

ASSESSMENT CRITERIA:

LO1. Prepare to Maintain Final Drive and Drive Lines assemblies

- Nature and scope of the work requirements are identified and confirmed
- WHS requirements, including individual State/Territory regulatory requirements and personal protection needs are observed throughout the work
- Procedures and information such as workshop manuals, specifications and tooling, are sourced
- Method options are analysed and those most appropriate to the circumstances are selected and prepared
- Technical and/or calibration requirements for the testing and maintenance of final drive and drive line assemblies are sourced and support equipment is identified and prepared
- Warnings in relation to working with gear, chain and tracked type assemblies are observed

LO2. Inspect final drive and drive line assemblies and analyse result

- Methods for the conduct of the system measurement and tests are implemented in accordance with workplace procedures and manufacturer/component supplier specifications
- 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. Maintain final drive and drive line assemblies

- Methods and sequence for the conduct of the Maintenance are implemented in accordance with workplace procedures and manufacturer/component supplier specifications
- All adjustments are made during the Maintenance in accordance with manufacturer/component supplier specifications
- Fill appropriate type of oil is topped up and level is

LO4. Prepare vehicle/machine for use or storage

- Maintenance schedule documentation is completed
- Final inspection is made to ensure protective guards, safety features and cowlings are in place
- Final inspection is made to ensure work is to workplace expectations
- Vehicle/machine is cleaned for use or stored to workplace expectations
- Job card is processed in accordance with workplace procedures

Annex: Resource Requirements

Module title: Maintaining Final Drive and Drive Lines				
Module code: EIS AUM3 M05 0322				
Item No.	**Category/Item**	**Description/ Specifications**	**Quantity**	**Recommended Ratio (Item: Trainee)**
A.	***Learning Materials***			
1.	TTLM	Prepared by the Ministry of labor and skills	25 Pcs	1:5
2	Reference and Text books			
2.1	Light and Heavy Vehicle Technology 4th ed.,	Nunney, M. J., Rutledge, 2007	5 Pcs	1:5
2.2	Automotive Technology: Principles, Diagnosis & Repair, and Service 3rd ed.	Halderman, D., Prentice Hall, 2008.	5 Pcs	1:5
2.3	Automotive Technology: A systems approach 7th ed.,	Erjavec, J., Delmar Cengage Learning, 2017	5 Pcs	1:5
2.4	Automotive Mechanics 10th 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.	***Learning Facilities & Infrastructure***			
1.	Class room	31.5 m^2	1 Pcs	1:25
2.	Work shop	For practical activity (4× 25m^2)	1 Pcs	4:1

3.	Work bench	Length x Width x Height (2m x 1.2m x0.78m)	5 Pcs	1:5
4.	White and/or black board	Length x Height (2.4m x 1.2m)	1 Pcs	1:25
5.	Arm chair	Length x Width x Height (1m x 0.55m x0.74m)	25 Pcs	1:1
6.	Chair (for trainer)	Length x Width x Height (0.4m x 0.56m x0.78m)	1 Pcs	1:25
7.	Table	Length x Width x Height (1.2m x 0.8m x0.74m)	1 Pcs	1:25
8.	Computer	(Desktop/Laptop)	1 Pcs	1:25
9.	LCD Projector		1 Pcs	1:25
C.	***Consumable Materials***			
	Rag	Cotton cloth	5m	1:5
1.	Detergent	Ordinary washing	5liter	1:5
2.	grease	Multipurpose EA-3	1can	1:25
3.	Gear box Oil	SAE, 90,140	5 liters	1:25
4.	Grease	API 3	5 kg	1:25
D.	**Tools and Equipment**			
I	***Hand tools***			
1	Measuring and testing Tools	Inside, outside	25 Pcs	1:1
2	Generic Mechanic Tools	All in one	25 Pcs	1:1
3	Special tools	Puller, Extractor	5 Pcs	1:5
4	Power tools	220 v portable	5 Pcs	1:5
5	Electrical measurement/device	Standard	5 Pcs	1:5
6	Measuring and testing Tools	Inside, outside	25 Pcs	1:1

LEARNING MODULE 06	
TVET-PROGRAMME TITLE:	Automotive Mechanics Level III
MODULE TITLE :	Maintaining Steering and Suspension System
MODULE CODE :	**EIS AUM3 M06 0322**
NOMINAL DURATION :	40 Hours

MODULE DESCRIPTION : This module covers the knowledge, skill and attitude required to carry out Maintenance of Steering and Suspension systems components, this include preparing for work, disassemble, inspection, maintain parts on mechanical and power assisted steering and different types of suspension system components**.**

LEARNING OUTCOMES

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

LO1. Plan and Prepare for Work

LO2. Disassemble and Inspect Steering and Suspension Systems Components

LO3. Maintain and Reassemble Components

LO4. Reinstall, Test and Clean Up Complete Work Area

MODULE CONTENTS:

LO1. Plan and Prepare for Work

1.1 Overview of different type steering and suspension systems

1.2 Suspension springs and dampers

1.3 Types of steering gears and hydraulic components

1.4 Common Steering System Complaints

1.4.1 Excessive Steering-Wheel Play

1.4.2 Nibble and feedback

1.4.3 Hard Steering

1.4.4 Pulling or Drifting

1.4.5 Sticking Steering or Poor Return

1.5 Sources of abnormal vibration and noise

1.6 OHS requirements

LO2. Disassemble and Inspect steering and suspension systems components

2.1 Cleaning and preparing for inspection

2.2 Inspecting steering system/component

2.3 Visual inspection of suspension system/component

2.4 Performing dry park test

2.5 Road test diagnosis of suspension

2.6 . Comparing and reporting inspection results

LO3. Maintain and reassemble components

3.1 Conducting maintenances

3.2 Steering wheel effort test and adjustment

3.3 Bleeding steering hydraulic system

3.4 Applying adjustments

3.5 Interpreting test results and reassembling

LO4. Reinstall, test and clean up complete work area

4.1 Completing reinstallations

4.2 performing functionality test

4.3 Work area and equipment cleared of waste

4.4 Preparing Parts/ vehicle for use

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

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

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

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

ASSESSMENT CRITERIA:

LO.1. Plan and prepare for work

- Work instructions, including repair order forms, specifications and operational
- Details are obtained, confirmed and applied.
- Safety requirements are followed in accordance with safety plans and policies.
- Tools and equipment selected to carry out tasks are consistent with the requirements of the job are checked for serviceability and any faults rectified or reported prior to commencement.
- Material requirements are identified and obtained in accordance with repair order form and/or specifications.
- Materials are safely handled and located ready for use in line with workplace procedures.
- Technical and/or calibration requirements for tools and equipment are sourced and implemented in line with workplace procedures.
- Environmental protection requirements are identified and applied in line with environmental plans and regulatory obligations.

LO.2. Disassemble and Inspect steering and suspension systems components

- Disassembled parts cleaned and ready for inspection in line with manufactures instruction and procedures
- Procedures and information required for inspecting and power assisted steering component and different types of suspension system components are identified and sourced in line with workplace requirements.
- Inspection methods are implemented according to workplace procedures and manufacturers' specifications.
- Inspection results are compared with manufacturers' specifications and results are documented
- Report is forwarded to appropriate personnel according to workplace procedures.

LO.3 Maintain and reassemble components

- Information required maintaining steering and suspension system components are accessed and interpreted from manufacturers' specifications.
- Steering and suspension system components are maintained using approved methods, equipment and materials, according to manufacturers' specifications.

- All adjustments made during the Maintenance are implemented in line with manufacturers' specifications.
- Unexpected or unplanned contingencies that are encountered in maintain steering and suspension system components are addressed through applying workplace procedures, previous experience and manufacturers' technical information.
- Maintenance, assembly and final performance test is conducted and results compared with manufacturers' specifications.

LO4. Reinstall, test and clean up complete work area

- Reinstallations of different type of steering and suspension system parts are completed in accordance with workplace procedures.
- Test for functionality of component and system is performed in accordance to manufacture specifications.
- Work area is cleared of waste, restored and secured in accordance with workplace procedures.
- Equipment used is cleaned, checked, maintained and stored in accordance with workplace procedures.
- Work completion details are finalized in accordance with workplace procedures.

Annex: Resource Requirements

MODULE TITLE: Maintaining Steering and Suspension System				
MODULE CODE: EIS AUM3 M06 0322				
Item No.	**Category/Item**	**Description/ Specifications**	**Quantity**	**Recommended Ratio (Item: Trainee)**
A.	***Learning Materials***			
1.	TTLM	Prepared by Ministry of labor and skills	25 Pcs	1:5
2.	Reference Books			
2.1	Automotive technology A Systems Approach 7th Edition	Jack Erjavec Rob Thompson	1 Pcs	1:5
2.2	Auto motive mechanics 10^{th} edition	William H.Crouse	1 Pcs	1:5
2.3	Automatic Transmissions and Transaxles	Seventh Edition James D. Halderman	1 Pcs	1:5
2.4	Automotive Transmissions	Second Edition Joachim Ryborz	1 Pcs	1:5
2.5	Automobile Engineering	G.B.S. NARANG	1 Pcs	1:5
2.6	Automobile engineering	R.K Rajput	1 Pcs	1:5
2.7	Auto motive mechanics 10^{th} edition	William H.Crouse	1 Pcs	1:5
2.8	Journals/Publication/Magazines			
B.	***Learning Facilities & Infrastructure***			
1.	Class room	31.5 m^2	1 Pcs	1:25
2.	White board / black board	240mX120m	1 Pcs	1:25
3.	Stool chair	55cmX100cmX70cm	25 Pcs	1:1
4.	Work shop	(4× 25)m^2	1 Pcs	1:25
C.	***Consumable Materials***			
1.	Rag	Cotton	5meter	1:5

2	Gear oil	API, SAE 90,140	5 liters	1:25
3	Brake fluid	Dot 3, Dot 4	1 liter	1:25
4	Fuel	Diesel, gasoline	15 liters	1:25
D.	***Tools and Equipment's***			
1.	Fire extinguisher	CO_2, 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 Pcs	1:5
E.	***Equipment's***			
1.	Engine stand	Multi-purpose	1 Pcs	1:5
2.	Bench	(12 x 2) m	1 Pcs	1:5
3.	Jack	Floor	1 Pcs	1:5
4.	Jack	For transmission	1 Pcs	1:5
5.	Work bench	Std	1 Pcs	1:5

LEARNING MODULE 07	
TVET-PROGRAMME TITLE:	Automotive Mechanic Level III
MODULE TITLE :	Maintaining Brake System
MODULE CODE :	**EIS AUM3 M07 0322**
NOMINAL DURATION :	50 Hours

MODULE DESCRIPTION : This module covers the knowledge, skill and attitude required to carry out Maintenances of break system and components, on mechanical, pneumatic, hydraulic, vacuum and power assisted, and electric braking system components. The module includes Prepare to Maintain, disassemble, inspect, repair/replace and Prepare vehicle for use or storage and handover.

LEARNING OUTCOMES

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

LO1. Prepare To Maintain Braking System

LO2. Remove, Disassemble and Inspect Components

LO3. Maintain Braking System Components

LO4. Prepare Brake Components for Use or Storage /Handover

MODULE CONTENTS:

LO1. Prepare to Maintain braking system

1.1. Theoretical concepts applicable to brake system

1.1.1. Principles of hydraulics and pneumatics

1.1.2. Characteristics of friction materials

1.1.3. Factors affecting braking performance

1.2. Types of brake system/components by application

1.2.1. Service

1.2.2. Hand/parking

1.2.3. Auxiliary

1.3. Types of brake system/components by operation

1.3.1. Mechanical

1.3.2. Hydraulic

1.3.3. Pneumatic

1.3.4. Hydro-pneumatic

1.4. OHS and environmental protection

1.5. Special service tools and equipment

1.6. Common Brake System complaints

1.6.1. Excessive Travel and Spongy Pedal

1.6.2. Excessive Pedal Effort Pulsation

1.6.3. Brakes dragging and Fading

1.6.4. Brakes Pull to One Side

1.6.5. Scraping Noise from Brakes

LO2. Remove, disassemble and inspect components

2.1 Removing and disassembling drum brake system components

2.2 Removing and disassembling disc brake system components

2.3 Inspecting pressure leakage of pneumatic brake system components

2.4 Testing boosters and brake chambers

2.5 Inspecting Brake system components

LO3. Maintain braking system components

3.1 Identifying and analyzing brake failure

3.2 Maintaining braking system and subassemblies

3.3 Overhaul of vehicle braking systems

3.4 Bleeding hydraulic system

3.5 Adjusting brake linkages

3.6 Checking the performance of brake on vehicle

LO4. Prepare brake components for use or storage /handover

4.1 Ensuring inspection safety feature

4.2 Using /storing brake component workplace expectation

4.3 Processing job card

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

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

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

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

ASSESSMENT CRITERIA:

LO.1 Prepare to Maintain braking system

- Nature and scope of the work requirements are identified and confirmed
- WHS requirements, including individual State/Territory regulatory requirements and personal protection needs are observed throughout the work
- Procedures and information such as workshop manuals, specifications and tooling and equipment, are sourced
- Method options are analyzed and those most appropriate to the circumstances are selected and prepared
- Technical and/or calibration requirements for Maintenances are sourced and support equipment is identified and prepared
- Warnings in relation to working with stored energy as in emergency braking actuators are observed
- Dangers working with brake dust and preventative measures are observed

LO.2 Remove, disassemble and inspect components

- Information is accessed and interpreted from manufacturer/ component supplier specifications for different types of braking system
- Braking system components are removed from vehicle, disassembled and inspected using approved methods, equipment and materials, in accordance with manufacturer/ component supplier specifications
- Methods for inspection is implemented in accordance with workplace procedures and manufacturer/component supplier specifications

LO.3 Maintain braking system components

- Determination is made as to the serviceability of the component
- Failed pneumatic and hydraulic components are tagged for rework
- Maintenances of braking system components/ sub-assemblies is completed without causing damage to any component or system
- Observations on the performance of the component is noted during maintenance
- All braking systems component Maintenances activities are carried out according to industry regulations/guidelines, WHS legislation, legislation and enterprise procedures/policies.
- Documentation of observations are completed

LO.4 Prepare brake components for use or storage /handover

- Inspection is made to ensure safety features are in place
- Final inspection is made to ensure work is to workplace expectations
- Brake component is presented for use or stored to workplace expectations
- Job card is processed in accordance with workplace procedures

Annex: Resource Requirements

MODULE TITLE: Maintaining Brake System				
MODULE CODE: EIS AUM3 M07 0322				
Item No.	**Category/Item**	**Description/ Specifications**	**Quantity**	**Recommended Ratio (Item: Trainee)**
A.	***Learning Materials***			
1.	TTLM	Prepared by Ministry of labor and skills	25 Pcs	1:5
2.	Reference Books			
2.9	Automotive technology A Systems Approach 7th Edition	Jack Erjavec Rob Thompson	1 Pcs	1:5
2.10	Auto motive mechanics 10th edition	William H.Crouse	1 Pcs	1:5
2.11	Automatic Transmissions and Transaxles	Seventh Edition James D. Halderman	1 Pcs	1:5
2.12	Automotive Transmissions	Second Edition Joachim Ryborz	1 Pcs	1:5
2.13	Automobile Engineering	G.B.S. NARANG	1 Pcs	1:5
2.14	Automobile engineering	R.K Rajput	1 Pcs	1:5
2.15	Auto motive mechanics 10th edition	William H.Crouse	1 Pcs	1:5
2.16	Journals/Publication/Magazines			
B.	***Learning Facilities & Infrastructure***			
1.	Class room	31.5 m^2	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	(4× 25) m^2	1 Pcs	1:1
C.	***Consumable Materials***			
1.	Rag	Cotton	5 meter	1:5

3	Brake fluid	Dot 3, Dot 4	1 liter	1:25
4	Fuel	Diesel, gasoline	15 liters	1:25
D.	***Tools and Equipment's***			
1.	Fire extinguisher	CO_2, 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 Pcs	1:5
E.	***Equipment's***			
6.	Bench	(12 x 2) m	1 Pcs	1:5
7.	Hydraulic Jack	For transmission	1 Pcs	1:5
8.	Floor Jack	For transmission	1 Pcs	1:5
9.	Work bench	Std	1 Pcs	1:5
10.	Stand	Safety stand	2 Pcs	1:5

LEARNING MODULE 08	
TVET-PROGRAMME TITLE:	Automotive Mechanics level III
MODULE TITLE :	Maintain Two and Three Wheeler Vehicle Assemblies
MODULE CODE :	**EIS AUM3 M08 0322**
NOMINAL DURATION :	100 Hours

MODULE DESCRIPTION : This module covers the knowledge, skill and attitude required to carry out removing, dismantle, repair, adjust and replace engine and power train system components of two and three wheeler vehicle**.** This includes preparation for work, inspection and diagnosing, overhauling and testing of functionalities of engine and power train assemblies of two and three-wheeler vehicle and preparation for use / storage.

LEARNING OUTCOMES

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

LO1. Prepare For Work

LO2. Remove Disassemble Inspect Two- and Three-Wheel Vehicle System Components

LO3. Overhauling of Two and Three-Wheeler Engine and Power Train Assembly

LO4. Make equipment ready for use handover

MODULE CONTENTS:

LO1. Prepare for Work

1.1 Introducing electrical / mechanical aggregates of two/three wheelers

1.1.Occupational Health & Safety (OH&S)

1.2.Identifying appropriate tools and equipment

LO2. Remove disassemble inspect two- and three-wheel vehicle system components

2.1 Visual checks and functional assessments

2.2 Removing electrical and mechanical aggregates

2.3 Disassembling electrical and mechanical aggregates

2.4 Calibrating and adjusting settings

2.4.1 Mechanical aggregates

2.4.2 Gear shifting and control systems

2.4.3 Electrical/electronic systems

LO3. **Overhauling of two and three-wheeler engine and power train assembly**

3.1 Overhauling engine and power train

3.2 Disassembling electrical and mechanical aggregates

2.5 Inspecting electrical and mechanical aggregates

3.3 Assembling electrical and mechanical aggregates

3.4 Pre-delivery test

LO4. Make equipment ready for use handover

4.1 Keeping work place and tools properly

4.2 Maintaining equipment and tools

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

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

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

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

ASSESSMENT CRITERIA:

LO.1 Prepare for work

- Work instructions are used to determine job requirements,
- Including quality, material, equipment quantities and service manuals based on working guideline.
- Job specifications are read and interpreted following work procedure.
- OH&S requirements, including personal protection needs are observed throughout the work according to Safety procedures.
- Electronic system protection devices, processes and precautions are identified appropriate to the application.
- Equipment and tools are identified and checked for safety and correct operation based on work requirement.
- Procedures are identified to minimise task time in line with work place guideline.

LO.2 Remove disassemble inspect two- and three-wheel vehicle system components

- Correct information is accessed and interpreted from manufacturer's specifications.
- Remove, disassembly and inspection procedures of two and three-wheeler vehicle systems are carried out according to manufacturer recommended procedures using **tools and, equipment** and techniques.
- Inspections are completed without causing damage to component or system based on working manual.
- Inspections results are used to diagnose system/component faults in line with working manual.
- Inspections are carried out according to industry regulations/guidelines OH&S and enterprise/procedures policies.

LO.3 Overhauling of two and three-wheeler engine and power train assembly

- Service/repair requirements are determined according to work requirement.
- Findings are restored in accordance with company specification manual
- Adjustment is mad in accordance to manufacture specification
- Correct information is accessed and interpreted from Manufacturer specifications.
- Overhauling requirements of engine and power train two and three-wheeler vehicle are carried out according to manufacturer recommended specifications and

procedures.

- Overhauling /repair is completed without causing damage to **component** or system following service manual.
- Mechanical and Electric systems are tested and results are documented in accordance with workplace policies and procedures.
- Maintained system functionality retest are carried out according to industry regulations/guidelines, OH&S and enterprise/ procedures policies.
- Workplace and equipment documents are completed in accordance with site requirements.

LO.4 Make equipment ready for use handover

- Material that can be reused is collected and stored based on storage procedures.
- Waste and scrap is removed according to workplace and OH&S procedures.
- Serviceable equipment is tagged and faults identified in accordance with workplace procedures.
- Operator maintenance is completed in accordance with manufacturer specifications and site procedures.
- Tools are stored in accordance with workplace procedures.

Annex: Resource Requirements

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MODULE CODE: EIS AUM3 M08 0322				
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B.	***Learning Facilities & Infrastructure***			
1.	Class room	31.5 m^2	1 Pcs	1:25
2.	White board / black board	240mX120m	1 Pcs	1:25
3.	Stool chair	55cmX100cmX70cm	25 Pcs	1:1
4.	Work shop	(4× 25) m^2	1 Pcs	1:25
C.	***Consumable Materials***			
1.	Rag	Cotton	5 meter	1:5
2	Gear oil	API, SAE 90,140	5 liters	1:25
3	Brake fluid	Dot 3, Dot 4	1 liter	1:25

4	Fuel	Diesel, gasoline	15 liters	1:25
D.	***Tools and Equipment's***			
1.	Fire extinguisher	CO_2, 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	Multi-purpose	5 Pcs	1:5
E.	***Equipment's***			
11.	Engine stand	Multi-purpose	1 Pcs	1:5
12.	Bench	(12 x 2) m	1 Pcs	1:5
13.	Jack	Floor	1 Pcs	1:5
14.	Jack	For transmission	1 Pcs	1:5
15.	Work bench	Std	1 Pcs	1:5
16.	Motor bike	125 cc 4stroke	2 Pcs	1:5
17.	Three- wheel	4stroke gasoline	2 Pcs	1:5
18.	Three- wheel	4stroke diesel	2 Pcs	1:5

Acknowledgement

The Ministry of Labor and Skills wishes to thank and appreciate trainers who donated their effort and time to develop this outcome-based curriculum for the TVET program Automotive Mechanics Level III. We also thank all regional TVET Bureaus and Colleges, Federal TVET Institute, Ethiopian Defense Engineering College, Ethiopian Management Institute and program facilitators for their active facilitation of their trainers for the development of this curriculum.

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