Bangladesh Technical Education Board

Agargaon, Shere Bangla Nagar, Dhaka

Transport Equipment Industry Sector Committee Bangladesh

National Competency Standards
For
Automotive Mechanics, NTVQF Level 4

Sponsored
By
The Project for Capacity Development Program of TTC, Rajshahi

TABLE OF CONTENTS

INTRODUCTION

These Competency Standards were developed by the Technical Sub Committee (TSC) that was established under **The Project for Capacity Development Program of TTC, Rajshahi** which is implemented by KOICA (Korea International Cooperation Agency) funded by the Government of Korea. The rules of Skill Development Policy are maintained to develop the standards. The competency standards are the foundation on which new competency based curriculum will be developed that responds better to the needs of industry for skilled workers. The members of the TSC are primarily from industry but with representatives from BKTTC, Chittagong, TTC, Rajshahi and BKTTC, Dhaka. Persons who will successfully complete the new TVET programs based on these competency standards will receive a qualification in the new National Technical and Vocational Qualification Framework (NTVQF).

Members of the TSC for the Occupation: **Automotive Mechanics.**

1. Name and Address of the Trade Expert :

   Mr. Choi Insung
   KCCI's external expert
   The Korea Chamber of Commerce & Industry
   39, Sejongdaero
   Jung-gu, Seoul, 04513 Korea

2. Name and Address of the Local Expert:
   Engr. Md. Nazrul Islam
   Principal
   Bangladesh-Korea Technical Training Centre, Chittagong
   Nasirabad, Chittagong
   Ph:682082, Cell: 01711-273708
   Email: ndewli@yahoo.com, chittagongbkttc@gmail.com

3. **Mr. Kawsar Ahmed**
   Sr. Mechanist
   Ifad Autos Limited, Dhaka
   Ph- 01912226083

4. **Mr. Md. Zohurul Islam**
   Niloy Motors Limited, Dhaka
   Ph- 01755570937

5. **Mr. Kazi Kiron Mia**
   Assistant Manager
   NAVANA Limited, Dhaka
   Ph 01711425642

6. **Mr. Jahsim Uddin**
   Auto Electric Foreman
   NAVANA Limited, Dhaka
   Ph-01715120652

7. **Mr. Md. Mosaddeque Hossain**
   Instructor
   Dhaka Polytechnic Institute
   Ph- 01914690344

8. **Mr. Syed Manjurul Kibria**
   Instructor (Automotive Mechanics)
   BK-TTC, Chittagong
   Ph- 01881467026

9. **Mr. Mirza Khaled Hossion**
   Senior Instructor, BKTTC, Dhaka
   01712087351
   mirza.khled@gmail.com

10. **Mr. Muhommad Abdul Quddous**
    Instructor, BKTTC, Chittagong
    01819863591
    quddous1974@yahoo.com

Endorsed by

Industry Skills Council	Bangladesh Technical Education Board (BTEB)
Date:	Date:

National Competency Standards for Automotive Mechanics
Transport Equipment Sector

Proposed Bangladesh NTVQF with Job Classifications

NTVQF Levels	Education Sectors			Job Classification
	Pre Vocation Education	Vocational Education	Technical Education	
NTVQF 6			Diploma in Engineering or Equivalent	Middle level Manager/ Sub Assistant Engineer etc.
NTVQF 5		National Skill Certificate 5 (NSC 5)		High Skilled Worker/Supervisor
NTVQF 4		National Skill Certificate 4 (NSC 4)		Skilled Worker
NTVQF 3		National Skill Certificate 3 (NSC 3)		Semi Skilled Worker
NTVQF 2		National Skill Certificate 2 (NSC 2)		Medium Skilled Worker
NTVQF 1		National Skill Certificate 1 (NSC 1)		Basic Skilled Worker
Pre-Voc 2	National Pre-Vocation Certificate in NPVC 2			Pre-Vocation Trainee
Pre-Voc 1	National Pre-Vocation Certificate in NPVC 1			Pre-Vocation Trainee

NTVQF level Descriptors

NTVQF level	Knowledge	Skill	Responsibility	Job Class
6	Comprehensive actual and theoretical knowledge within a specific study area with an awareness of the limits of that knowledge	Specialized and restricted range of cognitive and practical skills required to provide leadership in the development of creative solutions to defined problems	Manage a team or teams in workplace activities where there is unpredictable change . Identify and design learning programs to develop performance of team members.	Supervisor/Middle Level Manager/Sub Assistant Engr. Etc.
5	Very broad knowledge of the underlying. Concepts, principles, and processes in a specific study area	Very broad range of cognitive and practical skills required to generate solutions to specific problems in one or more study areas.	Take overall responsibility for completion of tasks in work or study. Apply past experiences in solving similar problems	Highly Skilled Worker/ Supervisor.
4	Very broad knowledge of the underlying. Concepts, principles, and processes in a specific study area	Range of cognitive and practical skills required to accomplish tasks and solve problems by selecting and applying the full range of methods, tools, materials and information.	Take responsibility, within reason, for completion of tasks in work or study. Apply past experiences in solving similar problems	Skilled Worker
3	Moderately broad knowledge in a specific study area.	Basic cognitive and practical skills required to use relevant information in order to carry out tasks and to solve routine problems using simple rules and tools.	Work or study under supervision with some autonomy	Semi- Skilled Worker.
2	Basic underpinning knowledge in a specific study area	Basic skills required to carry out simple tasks	Work or study under indirect supervision in a structured context.	Medium Skilled Worker
1	Elementary understanding of the underpinning knowledge in a specific study area	Limited range of skills required to carry out simple tasks	Work or study under direct supervision in a structured context	Basic Skilled Worker
Pre-Voc 2	Limited general knowledge	Very limited range of skills and use of tools required to carry out simple tasks	Work or study under direct supervision in a structured context	Pre-Vocation Trainee
Pre-Voc 1	Extremely limited general knowledge	Minimal range of skills required to carry out simple tasks	Simple work or study exercises, under direct supervision in a clear, well defined structured context	Pre-Vocation Trainee

Course Structure
for
Automotive Mechanics (NTVQF LEVEL IV)

Sl. No.	Unit Code and Title		UoC Level	Nominal Duration (Hours)
Generic - Compulsory (1 UoC required)				
1.	GN4006A1	Lead a small team	4	20
Occupation Specific – Compulsory (7 UoCs required)				
2	TRAAUTO4028A1	Carryout wheel alignment operation	4	30
3	TRAAUTO4029A1	Overhaul automotive engine	4	40
4	TRAAUTO4030A1	Overhaul automatic transmission system	4	50
5	TRAAUTO4031A1	Service electronic body management system	4	70
6	TRAAUTO4032A1	Install LPG, CNG and LNG system	4	40
7	TRAAUTO4033A1	Service emission control system	4	60
8	TRAAUTO4034A1	Perform shop management	4	20
Total Nominal Learning Hours				**330**

GENERIC UNIT

National Technical and Vocational Qualification Framework for Bangladesh

Unit of Competence

UNIT CODE & UNIT TITLE	GN100412A **Lead small team**	
NOMINAL HOURS	**20 hours**	
UNIT DESCRIPTOR	This unit covers the knowledge, skills, and attitude required to lead small team. It includes setting and maintaining team and individual performance standards**.**	
ELEMENTS OF COMPETENCY	PERFORMANCE CRITERIA ***Bold & Italic*** terms are elaborated in the Range of Variables	
1. Provide team leadership	1.1	***Work requirements*** are identified and presented to team members
	1.2	Reasons for instructions and requirements are communicated to team members
	1.3	***Team members' queries*** *and concerns* are recognized, discussed and dealt with.
2. Assign responsibilities	2.1	Duties, and responsibilities are allocated having regard to the skills, knowledge and aptitude required to properly undertake the assigned task.
	2.2	Duties are allocated having regard to individual preference, domestic and personal considerations, whenever possible.
3. Set performance expectations for team members	3.1	Performance expectations are established based on client needs and according to assignment requirements.
	3.2	Performance expectations are based on individual team members duties and area of responsibility
	3.3	Performance expectations are discussed.
4. Supervised team performance	4.1	***Monitoring of performance*** takes place against defined performance criteria and/or assignment instructions and corrective action taken if required
	4.2	Team members are provided with ***feedback***, positive support and advice on strategies to overcome any deficiencies.
	4.3	***Performance issues*** which cannot be rectified or addressed within the team are referenced to appropriate personnel.
	4.4	***Team members*** are kept informed of any changes in the priority allocated to assignments or tasks which might impact on client/customer needs and satisfaction
	4.5	Team operations are monitored to ensure that employer/client needs and requirements are met.
	4.6	Follow-up communication is provided on all issues affecting the team
	4.7	All relevant documentation is completed.

Range of Variables

Variable	**Range** (May include but not limited to):
Work requirements	1.1. Client Profile 1.2. Assignment instructions
Team member's concerns	2.1. Roster 2.2. shift details
Monitor performance	3.1. Formal process 3.2. Informal process
Feedback	4.1 Formal process 4.2 Informal process 4.3 Sandwich process
Performance issues	5.1. Work output 5.2. Work quality 5.3. Team participation 5.4. Compliance with workplace protocols 5.5. Safety 5.6. Customer service

Evidence Guide	
1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Maintained or improved individuals and/or team performance 1.2 Assessed and monitored team and individual performance against set criteria 1.3 Represented concerns of a team and individual to next level of management or appropriate specialist and to negotiate on their behalf 1.4 Allocated duties and responsibilities, having regard to individual's knowledge, skills and aptitude. and the needs of the tasks to be performed 1.5 Set and communicated performance expectations for a range of tasks and duties within the team and provided feedback to team members
2. Underpinning knowledge	2.1 Company policies and procedures 2.2 Relevant legal requirements 2.3 How performance expectations are set 2.4 Methods of Monitoring Performance 2.5 Client expectations 2.6 Team member's duties and responsibilities
3. Underpinning skills	Communication skills required for leading teams 3.1 Informal performance counseling skills 3.2 Team building skills 3.3 Negotiating skills
4. Required Attitude	4.1 Commitment to occupational health and safety 4.2 Environmental concerns 4.3 Eagerness to learn 4.4 Tidiness and timeliness 4.5 Respect of peers and seniors in workplace
5. Resource implications	The following resources MUST be provided: 5.1 Workplace 5.2 Tools, equipment and facilities appropriate to processes or activity 5.3 Materials relevant to the proposed activity 5.4 Equipment and outfits appropriate in applying safety measures 5.5 Relevant drawings, manuals, codes, standards and reference material
6. Method of assessment	Competency must be assessed through: 6.1 Written test. 6.2 Demonstration 6.3 Oral Questioning/Interview
7. Context for assessment	For certification competency should be assessed individually in the actual work place or simulated environment after completion of the module

Accreditation Requirements

Training Providers must be accredited by Bangladesh Technical Education Board (BTEB), the national quality assurance body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of any national qualification.

Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by BTEB.

OCCUPATION SPECIFIC UNITS

National Technical and Vocational Qualification Framework for Bangladesh
Unit of Competence

UNIT CODE & UNIT TITLE	TRAAUTO4028A1 Carryout wheel alignment operation	
NOMINAL HOURS	**30**	
UNIT DESCRIPTOR	This unit covers the Knowledge, skilled, and attitude required to carry out wheel alignment operations. It includes identifying and confirming work requirements, preparing for the work, carrying out pre-alignment inspection and wheel alignment, and completing workplace processes.	
ELEMENTS OF COMPETENCY	PERFORMANCE CRITERIA ***Bold & Italic*** terms are elaborated in the Range of Variables	
1. Prepare to carry out wheel alignment operation	1.1	Work practices observed and personal proactive equipment ***(PPE)*** worn as required for the work performed.
	1.2	Necessary ***tools and equipment*** are identified and collected in accordance with work requirement**.**
	1.3	Necessary ***material****s* are collected in accordance with work requirement.
	1.4	Warnings in relation to working with carry out wheel alignment operation are observed as per work procedure
2. Carry out wheel alignment pre-checks	2.1	Job requirements are determined from workplace instructions
	2.2	***Alignment pre-check information*** is sourced and interpreted
	2.3	Alignment pre-checks of vehicle wheels, steering and suspension condition are carried out according to manufacturer specifications.
	2.4	Faults are identified and reported according to workplace procedures as necessary
3. Perform wheel alignment activities	3.1	Vehicle wheel alignment specifications are sourced and interpreted
	3.2	Wheel alignment *equipment* is connected to vehicle according to manufacturer specifications
	3.3	Wheel alignment is carried out as per ***safe operating procedure***
	3.4	Corrective adjustments are carried out according to workplace procedures.
	3.5	Alignment is re-checked to confirm accuracy of adjustments
	3.6	Post-adjustment wheel alignment readings are recorded and reported according to workplace procedures
4. Complete work processes	4.1	Final inspection is made to ensure work is to workplace expectations and vehicle is presented ready for use
	4.2	Work area is cleaned, waste and non-recyclable materials

		are disposed of, and recyclable material is collected
	4.3	Tools and equipment are checked and stored according to workplace procedures
	4.4	Workplace documentation is processed according to workplace procedures

RANGE OF VARIABLES

Variable	Range (May include but not limited to):
1. PPE	1.1 Goggles 1.2 Hand Gloves. 1.3 Safety Shoes. 1.4 Apron/Boiler suit.
2. Tools and equipment	2.1 Four Post lift/scissor lift 2.2 Computerized Wheel Aligner (Calibration Tools) 2.3 Different types of wrench: ▪ Open Ended wrench ▪ Torque wrench. ▪ Socket wrench ▪ Wheel wrench 2.4 Assortment of screw driver. 2.5 Pliers 2.6 Allen Key set. 2.7 Hammer
3. Materials	3.1Waste Cotton 3.2 Kerosene 3.3 Grease
4. Alignment Pre check Information	4.1 Pre Diagnostic Questions (PDQ) from users 4.2 Test drive
5. Safe operating procedures	5.1 Treatments associated with vehicular movement, 5.2 manual and mechanical lifting and shifting, 5.3 Safe handling of tools and equipment 5.4 Necessary safety measure is taken for lift failure.

EVIDENCE GUIDE

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Observed safety procedures and requirements 1.2 Selected methods and techniques appropriate to the work requirement. 1.3 Performed Wheel Balancing and accuracy of tyre pressure and size
2. Underpinning knowledge	2.1 Operating principles of steering geometry and wheel alignment angles. 2.2 Vehicle pre-alignment inspection procedures, including: 2.3 Analyse tyre wear 2.4 Determine wheel run-out 2.5 Determine vehicle height 2.6 Types and operation of wheel alignment systems. 2.7 Relationships between fault symptoms and component defects 2.8 Procedures for measuring and adjusting steering angles 2.9 Procedures for carrying out four-wheel alignments 2.10 Steering system reset procedures to calibrate on-board system sensors with the steering geometry.
3. Underpinning skills	3.1 Using wheel aligning equipment 3.2 Applying checking technics of frame/chassis alignment 3.3 Application of aligning technics all four wheels of: One front wheel drive vehicle One rear wheel drive vehicle 3.4 Applying adjustment technic of ➢ camber ➢ caster ➢ King pin inclination (KPI) ➢ toe-in and toe-out ➢ Toe-out on turns.
4. Required Attitude	4.1 Commitment to occupational health and safety 4.2 Environmental concerns 4.3 Eagerness to learn 4.4 Tidiness and timeliness 4.5 Respect of peers and seniors in workplace
5. Resource implications	The following resources MUST be provided: 5.1 Workplace 5.2 Tools, equipment and facilities appropriate to processes or activity 5.3 Materials relevant to the proposed activity 5.4 Equipment and outfits appropriate in applying safety measures 5.5 Relevant drawings, manuals, codes, standards and reference material
6. Method of assessment	Competency must be assessed through: 6.1 Written test. 6.2 Demonstration 6.3 Oral Questioning/Interview
7. Context for assessment	For certification competency should be assessed individually in the actual work place or simulated environment after completion of the module
Accreditation Requirements	

Training Providers must be accredited by Bangladesh Technical Education Board (BTEB), the national quality assurance body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of any national qualification.

Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by BTEB.

National Technical and Vocational Qualification Framework for Bangladesh

Unit of Competence

UNIT CODE & UNIT TITLE	**TRAAUTO4029A1 Overhaul automotive engine**
NOMINAL HOURS	**40**
UNIT DESCRIPTOR	This unit covers the knowledge, skill and attitude required for overhauling engine. It includes preparing for the task, dismantling and checking the engine, carrying out the overhaul procedures, reassembling and testing the engine, and completing workplace processes.
ELEMENTS OF COMPETENCY	PERFORMANCE CRITERIA ***Bold & Italic*** terms are elaborated in the Range of Variables
1. Prepare to Overhaul Engine	1.1 Safe work practices observed and personal proactive equipment ***(PPE)*** worn as required for the work performed
	1.2 Necessary ***tools and equipment*** are identified and collected in accordance with work requirement.
	1.3 Necessary ***materials*** are collected in accordance with work requirement.
	1.4 Dismantling information is sourced and interpreted
	1.5 Dismantling options are analysed and those most appropriate to the circumstances are selected
2. Dismantle and evaluate engine and components	2.1 Engine and relevant components are dismantled according to instruction of service manual.
	2.2 Components are cleaned for evaluation according to workplace procedures.
	2.3 Components are compared with manufacturer specifications and serviceability is determined.
	2.4 Component repair method is determined
	2.5 Unserviceable parts are identified..
3. Overhaul Engine	
	3.1 Overhaul options are analysed to the circumstances are selected
	3.2 Overhaul tools and equipment are selected and checked for serviceability
	3.3 ***Overhauling works*** are carried out as per identified faults.
	3.4 Tolerances and clearances are measured against manufacturer specifications and necessary adjustments are made.
	3.5 Post-assembly testing is carried out according to workplace procedures.
4. Complete work processes	4.1 Final inspection is made to ensure work is to workplace expectations and engine is presented ready for use or storage
	4.2 Workplace documentation is processed according to workplace procedures
5. Clean & Store Equipment	5.1 Waste materials are disposed of in accordance with work place requirements***.***
	5.2 Cleaning of equipment is performed in accordance with standard procedure

	5.3 Tools and equipment are stored safely in appropriate location according to standard work place procedures.

Range of Variables

Variable	Range (May include but not limited to):
1. PPE	1.1 Hand Gloves. 1.2 Safety Shoes. 1.3 Apron/Boiler suit
2. Tools And Equipment	2.1 Socket wrench set 2.2 Combination wrenches 2.3 Adjustable wrenches 2.4 Different type screwdriver 2.5 Different type of hammer 2.6 Assorted pliers 2.7 Puller 2.8 Piston ring compressor and expander 2.9 Torque wrench 2.10 Scraper 2.11 Drain plug remover 2.12 Allen Key set 2.13 Oil drain tray. 2.14 Engine stand 2.15 Valve spring compressor 2.16 Vernier calliper. 2.17 Filler gauge 2.18 Micro meter 2.19 Dial gage 2.20 Plastic gage 2.21 Cylinder gage
3. Material	3.1 Kerosene 3.2 Waste Cotton 3.3 Engine Overhauling Kits 3.4 Liquid Pest 3.5 Engine Oil 3.6 Anti rust Thread Paste 3.7 Rust Remover
4. Engine component	All Components of Petrol & Diesel Engine
5. Overhauling works	5.1 Removing engine accessories 5.2 Disassembling engine 5.3 Cleaning engine parts 5.4 Inspection and testing engine parts 5.5 Machining works 5.6 Replace faulty parts 5.7 Assembling 5.8 Adjusting ➢ Tappet Clearance ➢ Timing Belt/Chain/gear ➢ Fan belt tension ➢ Main & Big end Bearing Clearance ➢ Piston Ring working gap and side clearance.

Evidence Guide

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Observed safety procedures and requirements 1.2 Selected proper methods and techniques. 1.3 Conducted the disassembling, Identification and re-assembling engine components. 1.4 Completed different type of timing and clearances. 1.5 Measured different types of pressure, gaps and torques. 1.6 Completed removal and installation of engine and associated components
2. Underpinning knowledge	2.1 Types, characteristics and operating principles of engines and associated engine components 2.2 Methods for cleaning and preparing engine 2.3 Engine dismantling procedures 2.4 Principle of inspection, measuring and evaluation procedures, 2.5 Principle of engine component repair and adjustment procedures, 2.6 Engine assembly procedures, 2.7 Working principle of bearing 2.8 Bearing Clearance
3. Underpinning skills	3.1 Identifying Engine component. 3.2 Using all kinds of tools, equipment and SST (special service tool) related to engine over hauling. 3.3 Using disassembling and assembling technics of engine parts 3.4 Applying techniques of removal and installation of engine . 3.5 Applying aligning technics of engine component 3.6 Applying technique of engine testing procedure
4. Required Attitude	4.1 Commitment to occupational health and safety 4.2 Environmental concerns 4.3 Eagerness to learn 4.4 Tidiness and timeliness 4.5 Respect of peers and seniors in workplace
5. Resource implications	The following resources MUST be provided: 5.1 Workplace 5.2 Tools, equipment and facilities appropriate to processes or activity 5.3 Materials relevant to the proposed activity 5.4 Equipment and outfits appropriate in applying safety measures 5.5 Relevant drawings, manuals, codes, standards and reference material
6. Method of assessment	Competency must be assessed through: 6.1 Written test. 6.2 Demonstration 6.3 Oral Questioning/Interview
7. Context for assessment	For certification competency should be assessed individually in the actual work place or simulated environment after completion of the module

Accreditation Requirements

Training Providers must be accredited by Bangladesh Technical Education Board (BTEB), the national quality assurance body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of any national qualification.

Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by BTEB.

National Technical and Vocational Qualification Framework for Bangladesh
Unit of Competency

UNIT CODE & UNIT TITLE	TRAAUTO4030A1 Overhaul automatic transmission system	
NOMINAL HOURS	50	
UNIT DESCRIPTOR	This unit covers the knowledge skilled and attitude required for over hauling automatic transmission to original manufacturer condition. It includes carrying out the overhaul process, reassembling and testing the transmission, and completing workplace processes	
ELEMENTS OF COMPETENCY	PERFORMANCE CRITERIA ***Bold & Italic*** terms are elaborated in the Range of Variables	
1. Prepare for overhauling of automotive transmission	1.1	Safe work practices observed and personal proactive equipment ***(PPE)*** worn as required for the work performed.
	1.2	Necessary ***tools and equipment*** are identified and collected in accordance with work requirement.
	1.3	Necessary ***materials*** are collected in accordance with work requirement
	1.4	Job requirements are determined from workplace instructions
	1.5	Dismantling information is sourced and interpreted
	1.6	Dismantling tools and equipment are checked for serviceability
2. Dismantle and check automatic transmission components	2.1	Transmission is dismantled in a logical sequence according to manufacturer and workplace procedures
	2.2	Components are cleaned for checking according to workplace procedures.
	2.3	***Visual inspection of Components*** are carried out and compared with manufacturer specifications and serviceability is determined
	2.4	Component repair method is determined as per instruction ***manual.***
	2.5	Unserviceable parts are identified and replacement parts sourced
3. Carry out overhaul	3.1	Overhaul technic is selected most appropriate to the circumstances.
	3.3	Components are machined, repaired and replaced as per performance requirement.
	3.4	Adjustments are carried out according to manufacturer specifications and workplace procedures .
4. Assemble transmission components	4.1	Transmission components are assembled according to manufacturer specifications.
	4.2	Tolerances and clearances are measured against manufacturer specifications and necessary adjustments are made.
	4.3	Assembly of transmission is completed within workplace timeframes
	4.4	Post-assembly testing is carried out according to workplace procedures .
	4.5	Problems detected as having been introduced during the assembly process are rectified.
5. Complete work processes	5.1	Final inspection is made to ensure work is to workplace expectations and transmission is presented ready for use or storage.
	5.2	Work area is cleaned, waste and non-recyclable materials are disposed of, and recyclable material is collected
	5.3	Tools and equipment are checked and stored according to workplace procedures.
	5.4	Workplace documentation is processed according to workplace

		procedures.

Range of Variables

Variable	Range (May include but not limited to):
1. PPE	1.1 Apron 1.2 Gloves 1.3 Goggles 1.4 Safety shoes
2. Tools and equipment	2.1 Hand and power tools ➢ Socket wrench set ➢ Combination wrenches ➢ Assortment of screw driver ➢ Different type of hammer 2.2 Required pliers 2.3 Multi meter 2.4 Hydraulic lifter/Mechanical lifter 2.5 Support stand 2.6 Transmission jack 2.7 Bench vise. 2.8 ATF Changer 2.9 Scanner 2.10 Allen key set. 2.11 Oil pressure gage.
3. Materials	3.1 Flushing oils 3.2 Required spare parts 3.3 Cleaning material 3.4 Automatic Transmission Fluid (ATF) 3.5 Waste Cotton
4. Inspection of transmission	4.1 Noise 4.2 Mounting 4.3 ATF Level/Quality 4.4 Gear Shifting 4.5 Related wiring and sensors(shift solenoid valve connectors and speed sensor),
5. Transmission Components	5.1 Electric wiring 5.2 Filter 5.3 Electric connector and sensor 5.4 Shifting lever linkage 5.5 Shift solenoid valve connectors 5.6 Torque converter. 5.7 Hydraulic pump 5.8 Governor 5.9 Clutch plate
6. 5.Manuals	5.1 Manufacturer's specification manual 5.2 Maintenance procedure manual 5.3 Periodic Maintenance Data 5.4 Service and Repair manual 5.5 Parts checklist

Evidence Guide

1. Critical aspects of competencies	Assessment requires evidence that the candidate : 1.1 Observed safety procedures 1.2 Conducted inspection to detect faults. 1.3 Performed repairing/servicing of transmissions and associated components 1.4 Carried out final test to ensure performance of transmission system.
2. Underpinning knowledge	2.1 Fault diagnosing procedures 2.2 Function and construction of torque converter 2.3 Transmission fluids and their application 2.4 Gear selection mechanisms 2.5 planetary gear sets mechanism 2.6 Basic operating principle of auto gear.
3. Underpinning skills	3.1 Conducting inspection. 3.2 ATF Fluid flashing and changing 3.3 Applying checking technics of ATF 3.4 Removing and refitting transmission components and accessories 3.5 Applying techniques to repair/service transmission system 3.6 Adjustment transmission components and accessories 3.7 Using the process of final testing.
4. Required Attitude	4.1 Commitment to occupational health and safety 4.2 Environmental concerns 4.3 Eagerness to learn 4.4 Tidiness and timeliness 4.5 Respect of peers and seniors in workplace
5. Resource implications	5.1 Workplace 5.2 Tools, equipment and facilities appropriate to processes or activity 5.3 Materials relevant to the proposed activity 5.4 Equipment and outfits appropriate in applying safety measures 5.5 Relevant drawings, manuals, codes, standards and reference material
6. Method of assessment	Competency must be assessed through: 6.1 Written test. 6.2 Demonstration 6.3 Oral Questioning/Interview
7. Context for assessment	For certification competency should be assessed individually in the actual work place or simulated environment after completion of the module

Accreditation Requirements

Training Providers must be accredited by Bangladesh Technical Education Board (BTEB), the national quality assurance body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of any national qualification.

Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by BTEB.

National Technical and Vocational Qualification Framework for Bangladesh

Unit of Competency

UNIT CODE & UNIT TITLE	**TRAAUTO4031A1 Service electronic body management systems**	
NOMINAL HOURS	**70**	
UNIT DESCRIPTOR	This unit covers the competence to service/repair electronic body management systems and/or associated components which include engine immobilization, central locking, power windows, electric mirrors, electronic seat adjustment with memory, security systems and back camera.	
ELEMENTS OF COMPETENCY	PERFORMANCE CRITERIA ***Bold & Italic*** terms are elaborated in the Range of Variables	
1. Prepare for work	1.1	Work instructions are used to determine job requirements, including quality, ***materials***, equipment quantities and service manuals
	1.2	Job specifications are read and interpreted
	1.3	***PPE*** is identified and worn as per workplace requirement
	1.4	Electronic system protection devices, processes and precautions are identified appropriate to the application
	1.5	***Tools and Equipment*** are identified and checked for safety and correct operation
2. Test control system and diagnose faults	2.1	Correct information is accessed and interpreted from manufacturer/component supplier specifications
	2.2	Tests of ***Electronic body management systems*** are carried out according to manufacturer/component supplier recommended procedures.
	2.3	Testing of ***fittings***/components are completed without causing damage to component or system
	2.4	Test results are used to diagnose system/component faults
	2.5	Service/repair requirements are determined as per test result
3. Service/repair body management systems	3.1	Correct information is accessed and interpreted from manufacturer/component supplier specifications
	3.2	Service/repair ***methods*** are carried out according to manufacturer/component supplier recommended specifications and procedures
	3.3	Service/repair is completed without causing damage to component or system
	3.5	Post testing are carried out for conformity of ***functions*** according to industry regulations/guidelines,
	3.6	Workplace and equipment documents are completed in accordance with site requirements
4. Clean work area and store tools and equipment	4.1	Material that can be reused is collected and stored
	4.3	Equipment and work area are cleaned and inspected for serviceable conditions in accordance with workplace procedures

	4.4	Unserviceable equipment is tagged and faults identified in accordance with workplace procedures
	4.6	Tools and equipment are cleaned and store in accordance with workplace procedures

Range of Variables

Variable	Range (May include but not limited to):
1. Personal protective equipment	1. Apron 2. Gloves 3. Goggles 1.5 Safety shoes
2. Material	1. Rust Remover
3. Tools and equipment	2.1 Hand tools 2.2 Multi-meters 2.3 Power tools 2.4 Special tools for removal/adjustment, 2.5 Assortment of Specialized system testers, 2.6 Scanner 2.7 LED test lights
4. Electronic body management systems	3.1 Engine immobilization 3.2 Central locking, 3.3 Power windows 3.4 Electric mirrors 3.5 Electronic seat adjustment with memory and security systems
5. Fittings	5.1 Fitting to light vehicles and/or heavy commercial vehicles 5.2 Outdoor power equipment
6. Functions	6.1 Engine immobilization 6.2 Central locking 6.3 Power windows 6.4 Electric mirrors 6.5 Electronic seat adjustment with memory and security systems
7. Service and repair methods	7.1 Identifying 7.2 Measuring and interpreting inputs and outputs, 7.3 Diagnosis and determining faults, 7.4 Pre- and post-repair testing of system and component operation, service and repair/replacement of system components, 7.5 Service and repair adjustments, 7.6 Removal, 7.7 Dismantling, 7.8 Reassembly and refitting, 7.9 Testing system operations and retrieval and assessment of electronic systems data, 7.10 Including fault codes
8. Manuals	8.1 Service manuals

	8.2 Workshop manuals

Evidence Guide

1. Critical aspects of competency	Assessment requires evidence that the candidate: 1.1 Observed safety procedures and requirements 1.2 Communicated effectively with others involved in or affected by the work 1.3 Selected appropriate methods and techniques. 1.4 Tested, inspected electronic body management systems/components 1.5 Diagnosed and determined the repair/replacement requirements to rectify faults 1.6 Serviced/repaired electronic body management systems to manufacturer/component supplier requirements
2. Underpinning knowledge	2.1 Electrical Electronics theory and principle 2.2 Operating principles of electronic body management system components 2.3 Construction and operation of electronic body management system components 2.4 Types and layout of service/repair manuals (hard copy and electronic) 2.5 Relationship to other electronically controlled systems, including shared components (e.g. ECU, sensors) 2.6 Testing, diagnosis and fault determination procedures
3. Underpinning skills	3.1 Using electronics measuring tools and equipment 3.2 Interpreting wiring circuit diagram 3.3 Applying wiring circuit preparing technics 3.4 Applying testing technics of electronic circuit and components 3.5 Assembling & disassembling of components 3.6 Removing and installing components. 3.7 Operating the engine scanner 3.8 Interpretation of the output data
4. Required Attitude	4.1 Commitment to occupational health and safety 4.2 Environmental concerns 4.3 Eagerness to learn 4.4 Tidiness and timeliness 4.5 Respect of peers and seniors in workplace
5. Resource implications	The following resources MUST be provided: 5.1 Workplace 5.2 Tools, equipment and facilities appropriate to processes or activity 5.3 Materials relevant to the proposed activity 5.4 Equipment and outfits appropriate in applying safety measures 5.5 Relevant drawings, manuals, codes, standards and reference material
6. Method of assessment	Competency must be assessed through: 6.1 Written test. 6.2 Demonstration 6.3 Oral Questioning/Interview
7. Context for assessment	For certification competency should be assessed individually in the actual work place or simulated environment after completion of the module

Accreditation Requirements

Training Providers must be accredited by Bangladesh Technical Education Board (BTEB), the national quality assurance body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of any national qualification.

Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by

National Technical and Vocational Qualification Framework for Bangladesh

Unit of Competency

UNIT CODE & UNIT TITLE	**TRAAUTO4032A1 Install CNG, LPG and LNG system**	
NOMINAL HOURS	**40**	
UNIT DESCRIPTOR	This unit covers the performance outcomes required to install compressed natural gas (CNG) fuel systems. It involves preparing for the task, selecting, installing, testing and adjusting the system for correct operation, and completing workplace processes.	
ELEMENTS OF COMPETENCY	PERFORMANCE CRITERIA ***Bold & Italic*** terms are elaborated in the Range of Variables	
1. Prepare to install CNG fuel system	1.1	Safe work practices observed and personal proactive equipment ***(PPE)*** worn as required for the work performed.
	1.3	CNG fuel system installation information is sourced and interpreted
	1.4	Installation options are analyzed and those most appropriate to the circumstances are selected
	1.6	***Tools, equipment and materials*** are selected and checked according to manufacturer specifications and workplace procedures
2. Carry out installation activities	2.1	CNG fuel system components are checked for correct application and damage.
	2.2	***CNG/*** **LPG/ LNG** ***fuel system components*** are installed according to workplace procedures.
	2.3	Wiring of electrical components is performed of CNG fuel system according to the wiring diagram of manufacturer.
	2.4	Installed ***CNG fuel system is tested*** for correct operation and required adjustments are made according to the workplace procedures.
	2.5	Final inspection is made to ensure work according to workplace expectations and system is presented ready for use.
3. Clean and store Tools and Equipment	3.1	Work area is cleaned, waste and non-recyclable materials are disposed of, and recyclable material is collected
	3.2	Tools and equipment are checked and stored according to workplace procedures
	3.3	Workplace documentation is processed according to workplace procedures

Range of Variables

Variable	Range (May include but not limited to):
1. PPE	1.1 Goggles 1.2 Masks 1.3 Safety Shoe 1.4 Hand gloves 1.5 Apron
2. Materials	2.1 Thread tape 2.2 Wood block 2.3 Clamp 2.4 Flexible Pipe
3. 2. Tools & Equipment	3.1 Socket wrench set 3.2 Combination wrenches 3.3 Adjustable wrenches 3.4 Different type screw driver 3.5 Different type of hammer 3.6 Assorted pliers 3.7 Allen Key Set 3.8 Electric hand drill 3.9 Tube cutter 3.10 Flaring tools 3.11 Ram 3.12 Exhaust gas analyser 3.13 Fire extinguisher
4. CNG fuel system components	4.1 Filler valve and filler hose 4.2 Pressure gage 4.3 Gas cylinder and mounting 4.4 Service line 4.5 Gas Regulator 4.6 Mixers or injectors with sockets 4.7 Associated electrical and electronic system, including selector switch , safety switches, petrol/gas solenoid, spark timing advance processor, lambda processor, solenoid etc.
5. LPG and LNG fuel system components	5.1 Filler valve and filler hose 5.2 Pressure gage 5.3 Gas cylinder and mounting 5.4 Service line 5.5 Vaporizer 5.6 Mixers or injectors 5.7 Low pressure valve 5.8 Associated electrical and electronic system, including selector switch , safety switches, petrol/gas solenoid, spark timing advance processor, lambda processor etc.
6. Testing CNG fuel system	6.1 System leak testing

	6.2 Exhaust gas analysis to ensure compliance with relevant emission control standards

Evidence Guide

1. Critical aspects of the competency	Assessment requires evidence that the candidate: 1.1 Observed safety procedures and requirements 1.2 Selected methods and techniques appropriate to the work requirement 1.3 Performed installation of the system components. 1.4 Tested CNG Fuel system components.
2. Underpinning knowledge	2.1 Occupational Safety & Health (OSH) requirements relating to installing CNG fuel systems. 2.2 Requirements of Natural gas (NG) fuel systems. 2.3 Containers and fuel system components, fuel service lines and materials 2.4 Type and Function of fuel control equipment 2.5 CNG system adjustment procedures, including exhaust gas analysis,
3. Under pinning skills	3.1 Identifying CNG fuel system component. 3.2 Using proper tools, related to the installation of CNG fuel system 3.3 Applying techniques of installation of CNG fuel system 3.4 Using wiring diagram of CNG fuel system 3.5 Testing operation of CNG fuel system. 3.6 Adjusting/Tuning accurate gas- air ratio.
4. Required Attitude	4.1 Commitment to occupational health and safety 4.2 Environmental concerns 4.3 Eagerness to learn 4.4 Tidiness and timeliness 4.5 Respect of peers and seniors in workplace
5 Resource implications	The following resources MUST be provided: 5.1 Workplace 5.2 Tools, equipment and facilities appropriate to processes or activity 5.3 Materials relevant to the proposed activity 5.4 Equipment and outfits appropriate in applying safety measures 5.5 Relevant drawings, manuals, codes, standards and reference material
6 Method of assessment	Competency must be assessed through: 6.1 Written test. 6.2 Demonstration 6.3 Oral Questioning/Interview
7 Context for assessment	For certification competency should be assessed individually in the actual work place or simulated environment after completion of the module

Accreditation Requirements:

Training Providers must be accredited by Bangladesh Technical Education Board (BTEB), the national quality assurance body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of any national qualification.

Accredited providers assessing against this unit of competency must meet the quality assurance

requirements set by BTEB.

National Technical and Vocational Qualification Framework for Bangladesh

Unit of Competency

UNIT CODE & UNIT TITLE	**TRAAUTO4033A1 Service emission control system**	
NOMINAL HOURS	**60**	
UNIT DESCRIPTOR	This unit covers the knowledge, Skills and Attitude required to service emission control systems on petrol or diesel powered engines. It also includes servicing and adjusting the system .	
ELEMENTS OF COMPETENCY	PERFORMANCE CRITERIA ***Bold & Italic*** terms are elaborated in the Range of Variables	
1. Prepare for service emission control system	1.1	Safe work practices is observed and personal proactive equipment ***(PPE)*** worn as required for the work performed.
		Tools, equipment and materials are selected and checked according in accordance with work place requirement
	1.2	work area is inspected and cleaned as per relevant work place standard.
	1.3	Servicing information is sourced and interpreted
2. Inspect emission control system	2.1	Inspection is carried out according to manufacturer specifications maintaining proper ***inspection method***
	2.2	Inspection results are compared with manufacturer specifications
	2.3	Inspection findings are reported according to workplace procedures, including recommendations of country's standard for necessary repairs or adjustments.
3. Service emission control system	3.1	Service and adjustments are carried out maintaining the ***safety requirement.***
	3.2	Post-service testing are carried out according to workplace procedures
	3.3	Final inspection is made to ensure work is to workplace expectations and vehicle or machinery is presented ready for use
5. Complete work processes	4.1	Work area is cleaned, waste and non-recyclable materials are disposed of, and recyclable material is collected
	4.2	Tools and equipment are checked and stored according to workplace procedures
	4.3	Workplace documentation is processed according to workplace procedures

Range of Variables

Variable	Range (May include but not limited to):
1. Personal Protective equipment	1.1 Goggles 1.2 Gloves 1.3 Apron 1.4 Helmet 1.5 Safety shoes 1.6 Musk
2. Tools and equipment	2.1 Hand tools, 2.2 Testing equipment, 2.3 Exhaust gas analyzer 2.4 Power tools, 2.5 Special tools for testing, removal or adjustment,
3. Materials	3.1 Spare parts of Emission control system, 3.2 Lubricants, 3.3 Diesel Particulate Filter (DPF) 3.4 Cleaning materials
4. Inspection methods	4.1 Road testing and 4.2 Exhaust gas testing 4.3 Visual, aural and functional assessments (including: damage, corrosion, air leaks, wear, testing of electrical circuits) 4.4 Measurements 4.5 Electronic system tests
5. Safety requirement	5.1 Conduct of operational risk assessment and treatments associated with vehicular movement, 5.2 Toxic substances, 5.3 Electrical safety, 5.4 Machinery movement and operation, 5.5 Manual and mechanical lifting and shifting, 5.6 Working in proximity to others and site visitors

Evidence Guide

1. Critical aspects of evidence	Assessment requires evidence that the candidate: 1.1 Observed safe work practices and worn personal protective equipment ***(PPE).*** 1.2 Inspected tools & equipment 1.3 Maintained 5S of housekeeping. 1.4 Followed proper inspection method 1.5 Done servicing by following safety requirement 1.6 Done final inspection to ensure work is to workplace expectations
2. Underpinning knowledge	2.1 OSH regulations/requirements, equipment, material and personal safety requirements 2.2 National Environment Protection Measures for Diesel Vehicles as applicable to tasks 2.3 Motor vehicle emissions and their effects on the environment 2.4 Principles of emission control and the reduction of HC, NOx, CO, CO2, particulates. 2.5 Smog types and of emission systems and components legislation 2.6 Types and layout of service/repair manuals 2.7 Type of testing
3. Underpinning skills	3.1 Applying techniques for the interpretation of technical information, graphic symbols and diagrams 3.2 Applying research and interpretive skills sufficient to locate, interpret 3.3 Applying analytical skills required for identification and analysis of technical information. 3.4 Establishing safe and effective work processes which anticipate and/or resolve problems and downtime. 3.5 Using mathematical ideas and techniques to correctly calculate time, assess tolerances, accurate measurements, material requirements and establish quality checks 3.6 Using workplace technology related to inspection and servicing of emission control systems. 3.7 Using diagnostic and servicing tools and equipment, measuring equipment. 3.8 Using Engine Scanner
4. Required Attitude	4.1 Commitment to occupational health and safety 4.2 Environmental concerns 4.3 Eagerness to learn 4.4 Tidiness and timeliness 4.5 Respect of peers and seniors in workplace
5. Resource implications	The following resources MUST be provided: 5.1 Workplace 5.2 Tools, equipment and facilities appropriate to processes or activity 5.3 Materials relevant to the proposed activity 5.4 Equipment and outfits appropriate in applying safety measures 5.5 Relevant drawings, manuals, codes, standards and reference material
6. Method of assessment	Competency must be assessed through: 6.1 Written test. 6.2 Demonstration 6.3 Oral Questioning/Interview
7. Context for assessment	For certification competency should be assessed individually in the actual

	work place or simulated environment after completion of the module

Accreditation Requirements

Training Providers must be accredited by Bangladesh Technical Education Board (BTEB), the national quality assurance body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of any national qualification.

Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by BTEB.

National Technical and Vocational Qualification Framework for Bangladesh

Unit of Competency

UNIT CODE & UNIT TITLE	**TRAAUTO4034A1 Perform shop maintenance**	
NOMINAL HOURS	**20**	
UNIT DESCRIPTOR	This unit covers inspecting, cleaning, arranging and storing tools and shop equipment, including repairing or servicing of repairable tools and equipment, disposal of waste and used lubricant and reporting of damaged tools and equipment with inventory in the shop	
ELEMENTS OF COMPETENCY	PERFORMANCE CRITERIA ***Bold & Italic*** terms are elaborated in the Range of Variables	
1. Prepare for shop management	1.1	Safe work practices is observed and personal protective equipment ***(PPE)*** worn as required for the work performed.
	1.2	***Tools, equipment*** and the work area is inspected and cleaned, free from dust, grease and other substances.
	1.3	***Cleaning solvent*** is used as per workshop cleaning requirements is observed.
	1.4	Work area is checked and cleaned as per standard level
	1.5	Wet surface or spot in the work area is kept dry
2. Store/arrange tools and shop equipment	2.1	Tools and equipment are arranged and stored in their respective shelves/ location
	2.2	Corresponding labels are posted and visible
	2.3	Tools are secured and logged in the record book.
3. Collect required spare parts	3.1	Required spare parts are identified
	3.2	Specifications of spare parts are prepared for purchasing
	3.3	spare parts are collected as per work requirement.
4. Repair/ Service Tools & Equipment	4.1	Faults of tools or equipment are identified for repairing and maintenance
	4.2	Proper spare parts are selected to replace unused tools
	4.3	Repair /service of tools & equipment are performed in accordance with specified schedule.
5. Dispose waste/used lubricant	5.1	Waste and used lubricants are disposed in accordance with the environmental regulations
	5.2	Containers for waste and used lubricants are properly labeled
	5.3	Personal safety in disposing waste and used lubricants is evident.
6. Prepare Report on damaged	6.1	Complete inventory of tools and equipment is maintained

tools/equipment with inventory	6.2	Damaged tools/equipment is identified with repair recommendation.
	6.3	Reports prepared on damaged tools/equipment have no error/discrepancy.

Range of Variables

Variable	Range (May include but not limited to):
1. Personal Protective equipment	1.1 Goggles, 1.2 Gloves, 1.3 Apron, 1.4 Helmet, 1.5 Safety shoes, 1.6 Mask.
2. Cleaning and Safety Equipment	2.1 First Aid Box 2.2 Vacuum cleaner 2.3 Air Compressor 2.4 Air Gun 2.5 Sweeping Duster. 2.6 Dust Bin 2.7 Sweeping Brush 2.8 Trolley 2.9 Exhaust fan 2.10 Fire extinguishers 2.11 Sand bucket
3. Materials	3.1 Kerosene 3.2 Detergent 3.3 Waste Cotton 3.4 Grease 3.5 Anti rust chemical

Evidence Guide

1. Critical aspects of evidence	Assessment requires evidence that the candidate: 1.1 Observed safe work practices and worn personal protective equipment ***(PPE).*** 1.2 Inspected tools & equipment 1.3 Used cleaning solvent 1.4 Cleaned tools & equipment 1.5 Kept floor dry 1.6 Made scope for proper ventilation and sufficient lighting
2. Underpinning knowledge	2.1 Principles of 5S of housekeeping. 2.2 Tools room managements. 2.3 Interpret service manual. 2.4 Principles of safe of handling chemicals. 2.5 Type of hazard 2.6 Communication and co-operation to team members. 2.7 Inventory System.
3. Underpinning skills	3.1 Calibrating of hand tools and power tools. 3.2 Calibrating of measuring tools 3.3 Sorting out faulty tools and equipment's. 3.4 Servicing of Hydraulics, Electrical and pneumatic equipment. 3.5 Identification, controlling of hazard 3.6 Applying Technic of Risk Assessment.
4. Required Attitude	4.1 Commitment to occupational health and safety 4.2 Environmental concerns 4.3 Eagerness to learn 4.4 Tidiness and timeliness 4.5 Respect of peers and seniors in workplace
5. Resource implications	The following resources MUST be provided: 5.1 Workplace 5.2 Tools, equipment and facilities appropriate to processes or activity 5.3 Materials relevant to the proposed activity 5.4 Equipment and outfits appropriate in applying safety measures 5.5 Relevant drawings, manuals, codes, standards and reference material
6. Method of assessment	Competency must be assessed through: 6.1 Written test. 6.2 Demonstration 6.3 Oral Questioning/Interview
7. Context for assessment	For certification competency should be assessed individually in the actual work place or simulated environment after completion of the module

Accreditation Requirements

Training Providers must be accredited by Bangladesh Technical Education Board (BTEB), the national quality assurance body, or a body with delegated authority for quality assurance to conduct training and assessment against this unit of competency for credit towards the award of any national qualification.

Accredited providers assessing against this unit of competency must meet the quality assurance requirements set by BTEB.