NATIONAL OCCUPATIONAL STANDARDS (NOS)

FOR THE CONVERSION, CALIBRATION AND MAINTENANCE OF AUTOGAS-POWERED (CNG/LPG/LNG) VEHICLES IN NIGERIA

NATIONAL SKILL QUALIFICATION FRAMEWORK (NSQF)

FOR TRAINING & CERTIFICATION IN THE CONVERSION, CALIBRATION AND MAINTENANCE OF AUTOGAS-POWERED VEHICLES IN NIGERIA - **(LEVEL I - IV)**

NATIONAL AUTOMOTIVE DESIGN AND DEVELOPMENT COUNCIL
(NADDC)

PREFACE

As the world becomes more aware about the causes of global warming, people are looking for ways to reduce its negative impacts on the environment. Gas-powered vehicle is a critical part of the solution to global warming.

The internal combustion engine (ICE) that drives all vehicles today uses technology that was developed a century ago. It is simply an explosion that drives a piston, fuelled by gasoline (petrol) or diesel. The output is not only kinetic power, but also, greenhouse gas emissions in the form of carbon dioxide. These greenhouse gasses are the systematic poisons driving an increase in global warming.

The use of gas-powered vehicles is one of the sure ways of reducing the emission from petrol and diesel. These vehicles converted/produced/installed to run on Auto gas produce far fewer amount of the harmful emissions associated with traditional fuels, and therefore, offer the best environmental alternative.

Studies have shown that gas powered vehicles are relatively cheaper, safe to drive, and are equipped with features that automatically shut-off gas supply in the event of an accident. The CNG/LPG cylinder has high impact resistance that prevents accidental exposure. Although, there are numerous safety features and benefits of gas-powered vehicles, the technology is still new, therefore, it was important to develop a National Occupational Standard (NOS) for gas-powered vehicles in Nigeria.

The Federal Government of Nigeria through the National Gas Expansion Programme (NGEP), now Presidential CNG Initiative (PCNGI) introduced the use of auto-gas (Compressed Natural Gas (CNG)/Liquefied Petroleum Gas (LPG), a green energy as an alternative source of fuel. The emergence of Autogas as an alternative to gasoline and diesel is the direct result of government's policies to address energysecurity and/or environmental concerns. The Council keyed into the initiative and created an enabling environment on the use of Autogas to power vehicles rather than petrol and diesel.

National Occupational Standards (NOS) specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the underpinning knowledge and understanding needed to meet standards consistently.

The development of the NOS and delivery of the NVQF is aimed at enthroning and institutionalizing competency based Technical Vocational Education and Training (TVET) in Nigeria. When fully operational, the framework would place out-of-school children, working adults, graduates and apprentices at both formal and non-formal settings in their rightful positions as far as skill acquisition and competency are concerned. The framework is a system designed for the development, classification and recognition of skills, knowledge and competencies acquired by individuals irrespective of where and how the skill was acquired. It gives a clear statement of what the learner must know or be able to do, whether the learning took place in a classroom, on-the-job or less formally.

For the developed NOS to be used for training of learners, it was imperative that they were classified into Qualification Credit Framework (QCF) or levels. The NVQF requires that all vocational trainings and learning must be quality-checked by qualified assessors and verifiers. In order to ensure the availability of qualified assessors and verifiers in the auto industry, the National Automotive Design and Development Council (NADDC) signed a MoU with the National Board for Technical Education (NBTE) for the training of 26 master trainers as Quality Assurance Assessors (QAA) and eight as Internal Quality Assurance Managers (IQAM)/Verifiers for the Automotive Industry. The trained quality assurance assessors and verifiers will support artisans, technicians to deliver quality and standard training in the auto sector.

The NVQF also stipulates that every sector must set up its Sector Skills Council. Based on the Act that established the Council and the activities executed by the Council in the development of standards, skills upgrade and training in the automotive industry, NBTE granted approval for NADDC to establish a Sector Skills Council for Automotive industry in Nigeria. The roles of the SSC include:

- Influence how training is delivered in Nigeria;
- Reduce skill gaps and shortages;
- Improve Productivity;
- Increase opportunities for all individuals in the workforce;
- Developing skill competency standards and qualifications;
- An employer-led organization that actively involves trade unions, professional bodies and other key stakeholders;
- Skills and workforce development of all those employed in their sectors;
- Setting up Labour Market Information System (LMIS) to assist planning and delivery of training and skill upgrade;
- Develop a sector skill development plan and maintain skill inventory;
- Identification of skill development needs and preparation of a catalogue of skill types;
- Standardization of accreditation process;
- Participation in accreditation and standardization;
- Plan and execute training of trainers and
- Establish process of coordinating and incorporating emerging trends in skill development.

It is expected that the introduction of NOS and implementation of NVQs in our automotive industry will lead to the following outcomes:

- ❖ Training will be industry- focused, through partnership (links) between the training providers, the Industries and enterprises they serve.
- ❖ Skills and competences obtained at various settings: on the job, at home or in a formal training institution, could be assessed and certified, thus expanding recognition and opportunities for progression.
- ❖ Curriculum will be flexible and could be delivered in a range of settings, presented in modular form so as to provide close guidance to the trainee and facilitator.
- ❖ Training will be competency-based so that employers are clear about what people can do,

- There will be a consistent system of certification which guarantees quality, as well as transportability of skill.
- Wide range of skills could significantly increase employability.
- Assessment process, being practical and work-based, could effectively check certificate racketeering and examination malpractices.

Conclusion

Safety is very important in carrying out repairs and maintenance of gas- powered vehicles due to the properties of gas therefore, only skilled partners are needed. The Council therefore attaches much premium on vocational training in the automotive industry. It is our firm belief that skills promotion and competency-based training is germane to unleashing the full potentials of the Nigerian Automotive Industry.

Oluwemimo Joseph Osanipin
Director General/CEO
National Automotive Design and Development Council (NADDC March, 2024.

FORWARD

I find the development and publication of this book, National Occupational Standards (NOS) for automotive mechanics timely considering the dearth of skills and competencies in our industries and the economy in general.

I am particularly excited about the publication because it goes to show that the project of institutionalizing national vocational qualifications and competency-based training is getting acceptance by the key stakeholders e.g. the industries, training providers, professional associations, regulatory agencies, etc. This clearly shows that we have collectively understood the challenges facing competency and skills development in Nigeria, especially in the ever dynamic automotive industry.

The skills development challenges started immediately after the third National Development Plan, when emphasis was shifted from competency to paper

qualifications resulting into over subscription of our institutions. Our educational institutions were disconnected from the industries and tended to place less emphasis on the manpower need of the industry resulting in proliferation of mainly academic programmes. Assessment and evaluation processes in TVET institutions, remain largely 'academic', in spite of global trend towards industry based standard. The training being delivered at the non-formal settings which has positive contributions to the economy is not coordinated, standardized and regulated. Worse still, government at all levels paid lip service to TVET and skills development.

It is based on these and many other TVET and skills challenges that NADDC in partnership with relevant stakeholders and international development partners commenced this drive for the institutionalization of National Skills Qualification Framework (NSQF) in the Nigerian automotive industry.

A qualification Framework provides descriptions of the knowledge and skills to be demonstrated as well as a common grid of skill levels for all qualifications included within the framework. It allows for "equivalences" to be established between elements of different qualifications. The Framework also facilitates establishment of progression routes between different fields of study, general and vocational education, learning in initial and further education and qualifications obtained through formal and non-formal education and training. The qualification framework is the structure where NSQs will operate.

This publication is a testament to the Council (NADDC)'s commitment towards sustainable and integrated development of the automotive industry in Nigeria. It will ensure that the Nigerian auto industry is in tandem with current trends globally. The NOS and NSQF is when fully implemented will achieve the following:

- Provide policy guidelines on organizing skills training to improve product quality, productivity and competitiveness in both formal and informal sector
- Provide a coherent structure for vocational qualifications, which are based on employment-led standards of competence
- Increase industry ownership of the traineeship system which enhance stakeholders input to major decisions
- Expand training opportunities so that they are more evenly spread across the workforce meeting the needs of all enterprises more equitably
- Facilitate access to, and mobility and progression within education training and career paths,
- Provide a policy framework for flexible curricula based on National Occupational Standards (NOS) dictated by the industry,
- Determine the levels of award, which enable clear roots of progression, and appropriate awards, which relate to employment,
- Determine convenient systems for recognition of prior achievement and, ❖ Expand access to education particularly lifelong learning through TVE.
- Provide system for up skilling, reskilling etc. of Nigerian youth and working adult.

I am not surprised that this feat has been achieved by NADDC because it has always exhibited its commitment and drive towards ensuring that the automotive industry

develops to its full potentials. The automotive industry is the only sector in Nigeria which has developed and documented NOS up to level five (5).

The Nigerian automotive industry and economy in general would no doubt be highly enriched by this publication as it opens up higher potentials for skills upgrade and competences development. These are potentials much desired in the ever dynamic automotive industry. To achieve the benefits inherent in this publication and leapfrog our industry to the desired level, its implementation requires the collaboration of relevant stakeholders both in the public and private sectors.

Prof. Idris M. Bugaje
Executive Secretary,
National Board for Technical Education (NBTE).

ACKNOWLEGEMENT

This undertaking would not have been completed successfully without the collaborative efforts and commitment of relevant stakeholders and experts in the automotive industry, the academia and regulatory agencies. Particularly worthy of mention are the following organizations that ensured that this document is qualitative and in sync with the current trends globally:

- Federal Ministry of Industry, Trade and Investment (FMITI)
- Federal Ministry of Labour and Employment
- National Board for Technical Education (NBTE), Kaduna;
- Nigeria Automobile Technicians Association (NATA);
- Niger State Science & Technical Schools Board (NSSTSB), Minna;
- Bascon Multi-Skills Development Agency Ltd, Enugu;
- National Business and Technical Examinations Board (NABTEB), Benin;
- Industrial Training Fund (ITF); and
- MotorMechs and Technicians Association of Nigeria (MOMTAN).
- Jet Motors, Lagos
- Stallion Motor Ltd, Lagos
- THLD Group
- Omaa Motors Ltd; Anambra State
- PAN Learning Centre, Kaduna

- Automotive and Locomotive Engineers Institute (AutoEI)
- Presidential Compressed Natural Gas Initiative (PCNGI)
- Niger State Science and Technical Schools Board
- Federal College of Education (Technical), Gombe
- Standards Organization of Nigeria (SON), Abuja
- Nigerian Institute of Transport Technology (NITT), Zaria
- Filkmou Limited, Lagos

We are indeed grateful and appreciative of the contributions and zeal exhibited by all stakeholders in accomplishing this national assignment.

We cannot thank them enough.

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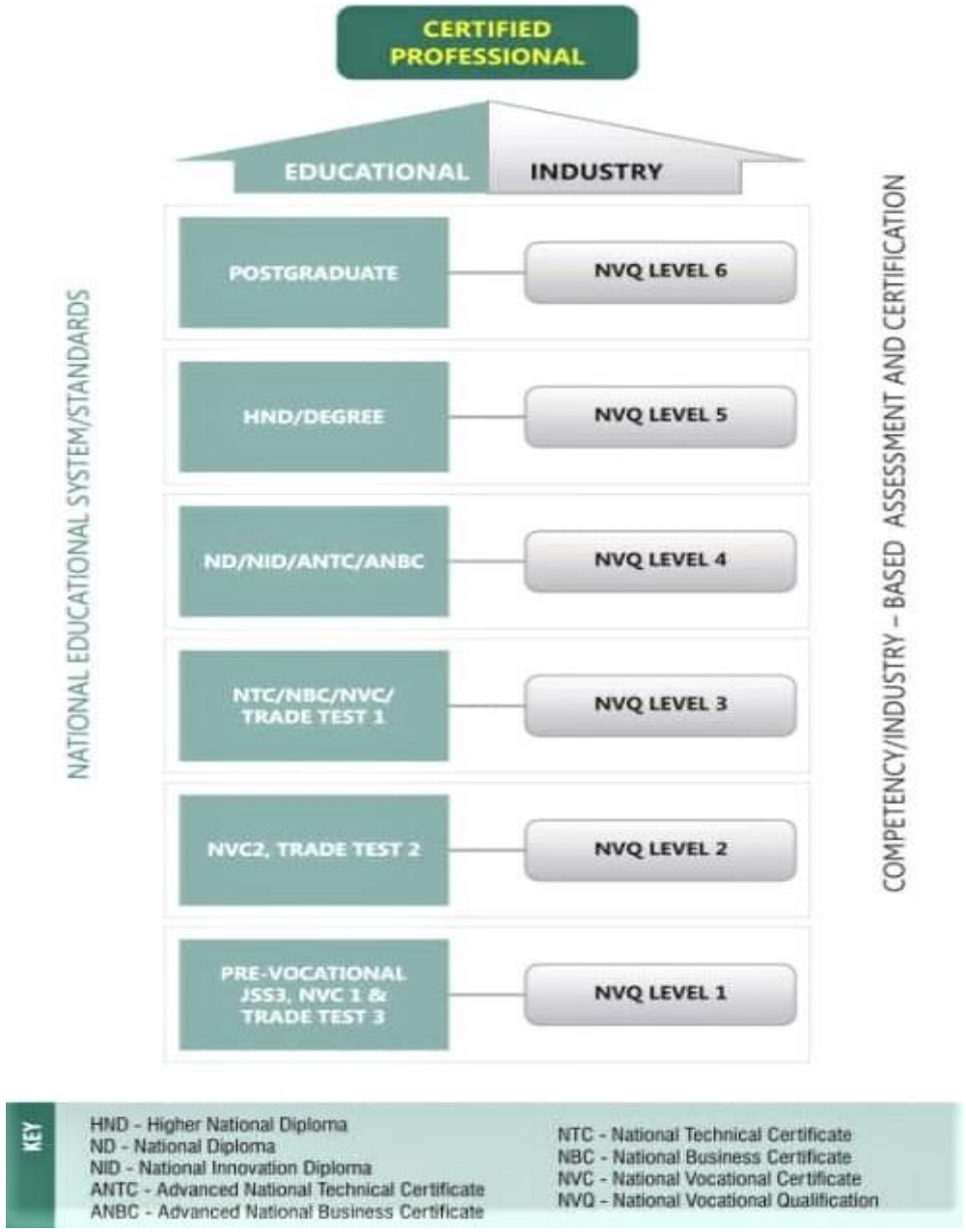
ABBREVIATIONS

NVQ	-	National Vocational Qualification
NVQF	-	National Vocational Qualification Framework

NOS	-	National Occupational Standard
LO	-	Learning Outcome
AM	-	Auto Mechatronics
NADDC	-	National Automotive Design and Development Council
NBTE	-	National Board for Technical Education
DO	–	Direct Observation
QA	–	Question and Answer
WT	-	Witness Testimony
PS	-	Personal Statement
IQA	-	Internal Quality Assurance
EQA	-	External Quality Assurance
HSE	-	Health Safety and Environment
WP	-	Work Product
RPL	-	Recognition of Prior Learning
PD	-	Professional Discussion
ASS	-	Assignment
MET	-	Mechanical and Electrical Trim
PPE	-	Personal Protective Equipment
KPI	-	King Pin Inclination
SAI	-	Steering Angle Inclination
OEM	-	Original Equipment Manufacturers
GDE	-	Generic Diagnostic Equipment
UDE	-	Universal Diagnostic Equipment
CFC	-	Chlorofluorocarbon
CAN	-	Controller Area Network
LIN	-	Local Interconnect Network
BEAN	-	Body Electronic Area Network
DC	-	Direct Current
AC	-	Alternating Current
EV	-	Electric Vehicle
GPV	-	Gas-Powered Vehicle

NATIONAL EDUCATIONAL SYSTEM/ STANDARDS



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MANDATORY NOS

S/NO/ UNIT	REFERENCE NO.	NOS TITLE	CREDIT VALUE	GUIDED LEARNING HOURS	REMARKS
1	NADDC/AM/L1/001	Automotive service tools, equipment, kits	3	30	
2	NADDC/AM/L1/002	Health, Safety and Environment In Automotive industry	2	20	
3	NADDC/AM/L1/003	Communication Process in an Automotive Environment	2	20	
4	NADDC/AM/L1/004	Team Work	1	10	
5	NADDC/AM/L1/005	Basic computer skills in Automotive Industry	2	20	

6	NADDC/AM/L1/006	Motor vehicle Tyres and wheels	2	20	
7	NADDC/AM/L1/007	Periodic maintenance Service	2	20	
8	NADDC/GPV/L1/008	Introduction to Gas-Powered Vehicles	3	30	
TOTAL CREDIT VALUE/LEARNING HOURS			**17**	**170**	

NOTE: Learners are required to cover all NOS at this level.

UNIT 001: AUTOMOTIVE SERVICE TOOLS, EQUIPMENT, KITS

Unit reference number: NADDC/AM/L1/001
QCF level: 1
Credit value: 3
Guided learning hours: 30 HOURS

Unit Purpose:

This qualification is about the basic use of tools, materials, kits and fabrications relevant to the automotive sector and for those working in technical support roles. It is also appropriate for workshop planners

This qualification is about:

1. Interpreting information
2. Adopting safe and healthy working practices
3. Selecting materials and equipment
4. Service and maintenance of workshop tools and equipment
5. Storage of workshop tools and equipment
6. Learning and Applying Workshop Tools and Equipment.

Unit assessment requirements/evidence requirements

Assessment must be carried out in real workplace environment in which automotive services and repair operations are carried out. Simulation is not allowed in this unit and level.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Project
- Work product

UNIT 001: AUTOMOTIVE SERVICE TOOLS, EQUIPMENT, KITS

LO (Learning outcome)		Criteria:-	Evid ence Type					Evidence Ref Page number			
LO1: Common Automotive service hand and power tools	1.1	Carry out operation using hand and power tools in accordance with safe working practices to achieve the work outcome.									

	1.2	Identify, Use and maintain; Hand tools Ancillary equipment Safety aids									
	1.3	Demonstrate work skills to select correct materials and fabrication for project									
	1.4	Demonstrate work skills to measure, mark out, file, fit, tap, thread, cut, drill, finish, position, carry/lift and secure.									
	1.5	Identify the software used for calibrating gas powered vehicles									
	1.6	Identify some special tools and equipment used for gaspowered vehicle conversion									
LO2: Common Automotive service workshop equipment											
	2.1	Carry out pre-start/preparation inspections on power tools and equipment in accordance with approved procedures									
	2.2	Store and secure workshop tools and equipment									
	2.	Conduct daily post-finish inspection before close of work (house cleaning)									
LO3: Maintenance and servicing of workplace tools and equipment											
	3.1	Identify damaged and worn out tools and equipment									
	3.2	Service, adjust and or maintain tools and equipment as specified by manufacturer's/ and or workshop within the scope of responsibility.									
	3.3	Identify problems associated with power tools and equipment which need to be referred to authorized personnel									
	3.4	Carry out checks in accordance with manufacturer's/operators guidance, legislation and official guidance and organizational requirements.									
LO4:											

Workshop Tools and Equipment Storage.	4.1	Store and secure workshop tools and equipment.										
	4.2	Dispose waste in accordance with legislation to maintain a clean work place.										

Learners Signature: Assessors Signature: IQA Signature (if sampled)	**Date:** Date: Date:
EQA Signature (if sampled)	**Date:**

UNIT 002: HEALTH, SAFETY AND ENVIRONMENT IN AUTOMOTIVE INDUSTRY

Unit reference number: NADDC/AM/L1/002
QCF level: 1
Credit value: 2
Guided learning hours: 20 HOURS

Unit Purpose: This qualification is about the knowledge and skills needed to competently carryout daily activities in an automotive workshop while complying with health, safety and environmental requirements**.**

Unit assessment requirements/evidence requirements

This assessment can only be carried out in a real automotive workplace environment where automotive activities are carried out. Simulation is not allowed in this unit and level.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Project
- Work product (WP)

UNIT 002: HEALTH, SAFETY AND ENVIRONMENT IN AUTOMOTIVE INDUSTRY

LO (Learning outcome)		Criteria:-	Evidence Type					Evidence Ref Page number			
LO 1 Personal health and hygiene	1.1	Use appropriate personal protective equipment (PPE).									
	1.2	Always work safely in line with occupational safety and health association standard (OSHA).									
	1.3	Ensure workplace injuries are treated by certified first aid technicians and or personnel									
	1.4	Report illness and infection promptly to the appropriate persons.									

	1.5	List contents of the first aid box and keep in an easily accessible place in the working environment.									
LO2											
Maintain personal health and hygiene	2.1	State own responsibility health and safety act as it relates to electric vehicles work environment.									
	2.2	State general rules on hygiene that must be followed in an electric vehicle working environment									
	2.3	Explain the following Personal Protection Equipment such as hard hat/head protection, foot protection, hand and body protection and regulatory protection on electric vehicles.									
	2.4	State the importance of maintaining good personal hygiene: clothing and environment									
	2.5	Explain the types of electric fire extinguishers and how to use them									
	2.6	Describe how to treat electric vehicle shocks, cuts, grazes, and wounds.									
	2.7	Describe the importance of giving first aid treatment to injured workers in an electric vehicle working environment.									
LO3 Housekeeping in an electric vehicle work environment.											
	3.1	Explain the importance of housekeeping									
	3.2	Identify tools and materials used for housekeeping.									
	3.3	Explain the consequences of not carrying out housekeeping in an electric vehicle working environment.									

	3.4	Remove and dispose components safely to meet legal workplace requirements									
	3.5	Carryout housekeeping in an electric vehicle work environment.									
	3.6	Store tyres and wheels, and other materials used on electric vehicle work environment in line with manufacturer's specifications									
LO 4											
Preparation and preservation of workshop Surfaces.	4.1	Explain how to clean grease, oil, paints, thinners									
	4.2	Explain how to make workshop ready for work.									
	4.3	Detect vermin and carryout effective vermin control.									
LO 5 Cleaning toxic and hazardous substances											
	5.1	Explain how to remove hazardous substances									
	5.2	Dispose solid and liquid wastes in line with relevant environmental laws									
	5.3	State the dangers associated with hazardous materials.									
LO6 Clearing of gangways/aisles and damaged insulations											
	6.1	Identify and remove damaged electric vehicles components on walkway									
	6.2	Identify and rearrange fire extinguishers, tools, etc on the gangway									
	6.3	Explain dangers associated with blocked gangways/aisles.									
	6.4	Clear exit and access ways.									
LO7 Report Housekeeping hazards											
	7.1	Report housekeeping hazards to supervisor.									
	7.2	Report identified housekeeping lapses to the supervisor.									

	7.3	Notify authority of potential oil and chemical spill and exposure of electric vehicle battery to unsafe condition.									
	7.4	Report chemical spill cleanup.									
LO8 Maintenance of hygienic, safe, and secure workplace											
	8.1	State the importance of working in a healthy, safe, and hygienic workplace									
	8.2	Report any accidents or near accidents quickly and accurately to the right authority/personnel.									
	8.3	Explain safe and unsafe acts									
	8.4	Follow health, hygiene and safely procedure during work									
	8.5	Practice emergency rescue procedures during work.									
		Emergency Drill, Muster Point.									
	8.6	Follow organizational security procedures. Engagement of a environmental Safety Officer.									
	8.7	Ensure the disposal of unused cables and other materials.									
	8.8	Carryout manual and mechanical lifting of the available component(s)									
LO 9											
	9.1	Identify any hazards or potential hazards and report to the appropriate authority									
	9.2	Explain where information about health and safety in your workplace can be obtained.									
	9.3	Describe the types of hazards in workplace that may occur and how to deal with them									

Prevention of hazards in the work place	9.4	Explain the hazards of high voltage energy that can be dealt with personally and those that should be reported to someone else									
	9.5	Explain how to warn other people about hazards and why this is important									
	9.6	Explain any accidents and near accidents should be reported and who they should be reported to									
	9.7	Describe the types of emergencies that may happen in the workplace and how to deal with it.									
	9.8	Explain where to find the firstaid equipment and who the registered first aider is in the workplace									
	9.9	Explain safe lifting and handling techniques that should be followed.									
	9.10	Explain the dangers of the DC rapid charge if not properly connected and too hot									
	9.11	Explain the failure of the good connections of the connector, interface or protocol between									
		the charger and the vehicle									
	9.12	Explain other ways of working safely that are relevant to own position and why they are important.									
	9.13	Describe organizational emergencies procedure, in									

		particular fire, and how these should be followed.									
	9.14	State the possible causes for fire in an electric vehicle workplace									
	9.15	State the possible causes for electric shock in the workplace									
	9.16	Explain how to resuscitate possible heart failure/electric shock victim									
	9.17	Describe how to minimize the possibility of fire in the workplace. Application of fire extinguishers.									
	9.18	State where to find the alarms and how to set them off									
	9.19	State why a fire should never be approached unless it is safe to do so									
	9.20	State the importance of following the fire safety laws									
	9.21	Describe the organizational security procedures and why these are important									
	9.22	Explain battery safe working temperature for electric vehicles									
	9.23	Explain the importance of reporting all usual or nonroutine incidents to the appropriate personnel.									

Learners Signature: Assessors Signature: IQA Signature (if sampled)	**Date:** Date: Date:
EQA Signature (if sampled)	**Date:**

003: COMMUNICATION PROCESS IN AN AUTOMOTIVE ENVIRONMENT

Unit reference number: NADDC/AM/L1/003
QCF level: 1
Credit value: 2
Guided learning hours: 20 HOURS

Unit Purpose: To establish a quality communication system that is responsive and subject to change in meeting workers and employers need, in work environment.

Unit assessment requirements/evidence requirements

This assessment can only be carried out in a real automotive workplace environment where automotive activities are carried out.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Project
- Work product

UNIT 003: COMMUNICATION PROCESS IN AN AUTOMOTIVE ENVIRONMENT

LO (Learning outcome)		Performance Criteria:-	Evide ıce Type					Evidence Ref Page number			
LO1: Non-complex communication system in a work environment	1.1	Use a simple verbal means to pass on necessary information.									
	1.2	Use non-verbal means to pass on necessary information e.g. body language.									
	1.3	Identify and explain symbols and signs appropriately.									
LO2: Information source identification in a work environment.											
	2.1	Identify the source of information in an organization and work environment.									
	2.2	Relate appropriately with the source of information.									

UNIT

	2.3	Use the various information flow systems in a work environment.									
	2.4	Use information sources to address challenges in a work environment.									
	2.5	Communicate findings in accordance to procedure in a work environment.									
LO3: Use of communication methods in a work environment											
	3.1	Identify the various methods of communication in the work environment.									
	3.2	Use effectively, the various methods of communication in a work environment and communicate effectively to the right personnel.									
	3.3	Observe information effectively using symbols, signs and codes.									
	3.4	Observe instructions in line with ethics of the work environment.									

Learners Signature:	**Date:**
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	**Date:**

004: TEAM WORK

Unit reference number: NADDC /AM /L1/004
QCF level: 1
Credit value: 1
Guided learning hours: 10 HOURS

Unit Purpose:

The purpose of this unit is to impart to the learner, skills, knowledge and understanding required to develop team spirit and positive working relationship.

Unit assessment requirements/evidence requirements

Assessment must be carried out in real workplace environment in which automotive services and repair operations are carried out. Simulation is not allowed in this unit and level.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Work product (WP)
- Recognition of Prior Learning (RPL) Professional Discussion (PD)

UNIT 004: TEAM WORK

LO (Learning outcome)	Performance Criteria		Evidence Type					Evidence Ref Page number			
LO1: Positive working relationship with colleagues	1.1	Identify the need for developing positive relationship with colleagues.									
	1.2	Recognize the importance of relating with other people in a									

UNIT

		way that makes them feel valued and respected.									
	1.3	Assist team members when required.									
	1.4	Report to the appropriate personnel when request/requesting for assistance fall outside area of responsibility.									
	1.5	Communicate information to colleagues about own work that might affect others.									
LO2: Take Responsibilities within the team											
	2.1	Recognize own role and responsibilities within the team.									
	2.2	Perform individual tasks in line with the team rules and regulations.									
	2.3	Participate effectively in teamwork.									
LO3: Compliance with organizational policies											
	3.1	Work In line with organizational standard and structure.									
	3.2	Use organizational code of practice.									
	3.3	Explain organizational code of conduct.									

Learners Signature:	**Date:**
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	**Date:**

005: BASIC COMPUTER SKILLS IN AUTOMOTIVE INDUSTRY

Unit reference number: NADDC/AM/L1/005
QCF level: 1
Credit value: 2
Guided learning hours: 20

Unit Purpose:

This unit is to provide the necessary skills and competency required for computer usage in the automotive industry.

Unit assessment requirements/evidence requirements

Assessment must be carried out in real workplace environment in which automotive services and repair operations are carried out. Simulation is not allowed in this unit and level.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Work product (WP)
- Recognition of Prior Learning (RPL)
- Professional Discussion (PD)
- Assignment (ASS)

UNIT 005: BASIC COMPUTER SKILLS IN AUTOMOTIVE INDUSTRY

UNIT

LO (Learning outcome)		Performance Criteria	Evidence Type					Evidence Ref Page number			
LO 1: Computer classification and operation	1.1	Identify computers according to usage, type and size.									
	1.2	Differentiate between analogue, digital and hybrid computers.									
	1.3	Identify and describe the various types of microcomputers.									
	1.4	Carryout a given tasks using the computer.									
LO 2: Use of computers in modern automobile workshops.											
	2.1	Explain the roles of computer systems in modern motor vehicles.									
	2.2	Explain the various applications of computer in									
		automobile workshop.									
	2.3	Identify the characteristics and benefits of computer in automotive workshop.									
LO 3: Computer Hardware and Software Elements											
	3.1	Identify and explain the functions of various hardware and software components of the computer.									
	3.2	Differentiate between operating system and application software.									
	3.3	Select application software for a particular operation.									
LO4: Basic computer Operation											
	4.1	Operate the keyboard using function keys, alphanumeric keys, numeric keys and control keys.									
	4.2	Carryout typing exercise on the computer.									

Learners Signature: Assessors Signature: IQA Signature (if sampled)	**Date:** Date: Date:
EQA Signature (if sampled)	**Date:**

UNIT 006: MOTOR VEHICLE TYRES AND WHEELS

Unit reference number: NADDC /AM/L1/006
QCF level: 1

Credit value: 2
Guided learning hours: 20

Unit Purpose:

This unit is about inspecting standard light motor vehicle tyres and wheels to assess their conditions and suitability for repair and carrying out necessary repair, replacement or refitting activities. It includes replacement and repair procedures for wheels, tyres and tubes.

Unit assessment requirements/evidence requirements;

This assessment can only be carried out in a real automotive workshop environment in which replacement and repair procedures for wheels, tyres, and tubes are carried out.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Project
- Work product (WP)

UNIT 006: MOTOR VEHICLE TYRES AND WHEELS

LO (Learning outcome)		**Performance Criteria:-**	Evidence Type					Evidence Ref Page number			
LO1: Wheels/tyre classification and characteristics	1.1	Explain various tyre classification and their characteristics.									
	1.2	Explain and use wheel/tyre data according to manufacturer's specifications.									
LO2: Tools/equipment for wheels/tyre repairs and replacement											
	2.1	Identify and select tools and equipment used in wheels/tyre repairs.									
	2.2	Carry out all inspection, repair and replacement activities using suitable tools and equipment.									

	2.3	Ensure that all tyre/wheel tools and equipment are safe prior to use.									
LO3:											
Inspect, repair and replace motor vehicle tyres and wheels	3.1	Use suitable personal protective equipment and motor vehicle coverings throughout all tyres and wheels inspection, repair and replacement activities.									
	3.2	Use suitable sources of technical information to support your inspection, repair and replacement of tyres and wheels									
	3.3	Operate in a way which minimizes the risk of damage to the motor vehicle and its systems.									
	3.4	Perform all inspection, repair and replacement activities following: manufacturer's instructions your workplace procedure health, safety and environment requirements.									
	3.5	Dispose of removed components safely to meet legal and your workplace requirements.									
	3.6	Ensure that replaced and refitted tyres and valves are correctly fitted.									
	3.7	Report any anticipated delays in completion and any additional faults identified to the relevant personnel promptly.									
	3.8	Carryout wheel balancing operations.									
	3.9	Carry out appropriate repairs according to manufacturers' specification on wheels with tyre pressure sensor.									

	3.10	Select replacement tyres in accordance with manufacturer's specifications.									
	3.11	Interpret and use wheel data according to manufacturer's specifications.									
	3.12	Store tyres and wheels in line with workplace procedures.									
	3.13	Carryout tyre replacement in accordance with motor vehicle									
		manufacturer's specification.									
	3.14	Complete all activities within the agreed timescale.									

Learners Signature:	**Date:**
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	**Date:**

UNIT 007: PERIODIC MAINTENANCE SERVICE

Unit reference number: NADDC /AM/L1/007

QCF level: 1
Credit value: 2
Guided learning hours: 20 HOURS

Unit Purpose:
This unit is about conducting routine examination, adjustment and replacement activities as part of the periodic servicing of motor vehicles.

Unit assessment requirements/evidence requirements:
This assessment can only be carried in a real workplace environment in which automotive service and repair operation are carried out in a workshop environment effectively. Live engines and functional motor vehicles shall be provided.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Project
- Work product

UNIT 007: PERIODIC MAINTENANCE SERVICE

LO (Learning outcome)		Performance Criteria:-	Evidence Type					Evidence Ref Page number			
LO 1: Construction (fitting) and application of filters	1.1	List and identify the various types of filters and their components.									
	1.2	Identify different filters and the filtrations system (paper filters, fabric, cyclone, wiremesh filters, etc.)									
	1.3	Identify the application of pre-filtration and filtration systems.									

	1.4	Identify and apply correct specifications and tolerances for the vehicle when making assessments of system and component performance.									

	1.5	Work in a way which minimizes the risk of damage to the vehicle filtration and its systems									
LO2: Procedures for conducting a lubrication service											
	2.1	Use manufacturer's routine maintenance checklist accurately									
	2.2	Use suitable personal protective equipment and vehicle coverings throughout all vehicle maintenance activities									
	2.3	Identify and ensure vehicle's systems and components complies with the following; The manufacturer's approved examination methods Your workplace procedures Health, Safety and environment requirements									
	2.4	Use only the correct specifications and tolerances for the vehicle when making assessments of system and component performance									
LO 3 Demonstrate procedure for servicing an engine											
	3.1	Use suitable personal protective equipment and vehicle coverings throughout all maintenance activities									

3.2	Use suitable sources of technical information to support all your vehicle maintenance activities									
3.3	Measure the vehicle's systems and components following: The manufacturer's approved examination methods Your workplace procedures Health, Safety Environment requirements									

3.4	Ensure your examination methods identify accurately any vehicle system and component problems falling outside the specified maintenance schedule									
3.5	Disable and re-assemble components in a way which minimizes the risk of damage to the vehicle and its systems.									
3.6	Use suitable and accurate testing methods to evaluate the performance of all replaced and adjusted components/systems.									
3.7	Promptly communicate any problems or issues relating to the vehicle's condition or conformity to the relevant personnel.									
3.8	Ensure that maintenance records are accurate, complete and passed to the relevant personnel promptly in the format required.									
3.9	Identify and use appropriate diagnostic tools and equipment for routine vehicle maintenance.									

	3.9.1	Communicate any anticipated delays in completion to the relevant personnel.									
	3.9.2	Perform all vehicle maintenance activities within the agreed timescale.									
LO 4 Demonstrate procedure for Carrying out Maintenance on Gas powered vehicles											
	4.1	List the types of maintenance required in gas-powered vehicles									
	4.2	Carry out visual inspections on gas-powered vehicles to identify the following: - Leakage - Loose connections - Vibrations - etc.									
	4.3	Identify worn out or defective components									

Learners Signature:	**Date:**
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	**Date:**

UNIT 008: INTRODUCTION TO GAS-POWERED VEHICLES

Unit reference number: NADDC/GPV/L1/008
QCF level: 1
Credit value: 3
Guided learning hours: 30 HOURS

Unit Purpose:
This qualification is about identifying, understanding the basic features of gas-powered vehicle and it differences compared with an internal combustion engine-powered vehicle.

Unit assessment requirements/evidence requirements:
This assessment can only be carried in a real workplace environment where automotive and gas-powered vehicles service and repair operation are carried out in a workplace environment effectively. Live engines and functional vehicles shall be provided.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Project
- Work product

UNIT 008: INTRODUCTION TO GAS-POWERED VEHICLES

LO (Learning outcome)		Performance Criteria:-	Evidence Type					Evidence Ref Page number			
LO 1: Overview of fuels	1.1	Explain the term fuel									
	1.2	List the different types of fuels used in vehicles									
	1.3	Explain the basic properties of fuels listed in 1.2									

	1.4	Identify areas of applications of the various fuels listed in 1.2									
	1.5	Explain the safety measures and regulations provided by Statutory bodies (ISO, SON, etc) regarding Autogas Conversion Kits installation.									
LO2: Basic Combustion Process											
	2.1	Explain the term combustion									
	2.2	Explain the basic combustion process of conventional spark ignition engine.									
	2.3	Explain the basic combustion process of conventional compression ignition system									
	2.4	Explain the basic combustion process of gas-powered vehicles.									
	2.5	Explain the advantages and disadvantages of Autogas over fossil fuel									
LO 3: Introduction to Gas-Powered Vehicles Fuel System Layout											
	3.1	Identify types of Autogas powered vehicles									
	3.2	Explain Gas-powered vehicle system layout									
	3.3	List the components/kits of gas-powered vehicle fuel system									
	3.4	Explain the basic functions of the components/kits listed in 3.3									
	3.5	Differentiate between the tanks used in Autogas(LPG/LPG and d CNG) powered vehicles.									
	3.6	Identify the applications of gaseous fuels in vehicles e.g. cars, trucks, heavy duty vehicles									
LO4: Identify Tanks and Tank											
	4.1	Demonstrate the processes of Open Vehicle Tank									

Installations		Installations									
	4.2	Explain the criteria or consideration for Tank Selection									
	4.3	Explain the following criteria or consideration for Tank Selection: ❖ Tank Size ❖ Range ❖ Placement ❖ Tank Locations									
	4.4	Explain the need for different sizes of pipes in the conversion process									

Learners Signature:	**Date:**
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	**Date:**

LEVEL II

Summary of Level II

MANDATORY NOS

S/NO/ UNIT NO	REFERENCE NO.	NOS TITLE	CREDIT VALUE	GUIDED LEARNING HOURS	REMARKS
1	NADDC/AM/L2/001	Communication Process in an Automotive Work Environment	2	20	
2	NADDC/AM/L2/002	Health, Safety and Environment In Automotive Industry	2	20	
3	NADDC/AM/L2/003	Fastening(Joining) Techniques used in Automotive Services and repair operation	3	30	
4	NADDC /GPV/L2/004	Introduction to Gas Powered Vehicles	3	30	

5	NADDC /GPV/L2/005	Introduction to Conversion (GPV)	3	30	
6	NADDC/AM/L2/006	Removal/Fitting of Mechanical and electrical Trim (MET) components in a motor vehicle.	3	30	
7	NADDC/AM/L2/007	Team Work	1	10	
8	NADDC/AM/L2/008	Basic Computer Skills in Automotive Industry	2	20	
		TOTAL CREDIT HOURS	**19**	**190**	

OPTIONAL NOS (Specialty)

S/NO	OPTIONAL NOS	NOS TITLE	CREDIT VALUE	GUIDED LEARNING HOURS	REMARKS
9	NADDC/AM/L2/009	Motor vehicle wheel alignment operations	2	20	
10	NADDC/AM/L2/010	Motor vehicle wheel balancing operations	2	20	
11	NADDC/AM/L2/011	Periodic Maintenance Service	2	20	
		TOTAL CREDIT/GUIDED LEARNING HOURS	**6**	**60**	

NOTE: Learners are required to select two (2) units from the optional units

UNIT 001: COMMUNICATION PROCESS IN AN AUTOMOTIVE ENVIRONMENT

Unit reference number: NADDC/AM/L2/001
QCF level: 1
Credit value: 2
Guided learning hours: 20

Unit Purpose: To establish a quality communication system that is responsive and subject to change in meeting workers and employers need, in work environment.

Unit assessment requirements/evidence requirements

This assessment can only be carried out in a real automotive workplace environment where automotive activities are carried out.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Project

- Work product (WP)

UNIT 001: COMMUNICATION PROCESS IN AN AUTOMOTIVE ENVIRONMENT

LO (Learning outcome)		Performance Criteria:-	Evide ıce Type					Evidence Ref Page number			
LO1: Non-complex communication system in a work environment	1.1	Use a simple verbal means to pass necessary information.									
	1.2	Use non-verbal means to pass on necessary information e.g. body language.									
	1.3	Identify and explain symbols and signs appropriately.									
LO2: Information source identification in a work environment.											
	2.1	Identify the source of information in an organization and work environment.									
	2.2	Relate appropriately with the source of information.									
	2.3	Use the various information flow systems in a work environment.									
	2.4	Use information sources to									
		address challenges in a work environment.									
	2.5	Communicate findings in accordance to procedure in a work environment.									
LO3: Use of communication methods in a work environment											
	3.1	Identify the various methods of communication in the work environment.									
	3.2	Use effectively, the various methods of communication in a work environment and communicate effectively to the right personnel.									
	3.3	Observe information effectively using symbols, signs and codes.									

	3.4	Observe instructions in line with ethics of the work environment.									

Learners Signature: Assessors Signature: IQA Signature (if sampled)	**Date:** Date: Date:
EQA Signature (if sampled)	**Date:**

UNIT 002: HEALTH, SAFETY AND ENVIRONMENT (HSE) IN AUTOMOTIVE INDUSTRY

Unit reference number: NADDC/AM/L2/002
QCF level: 1
Credit value: 2
Guided learning hours: 20

Unit Purpose: This unit is about the knowledge and skills needed to competently carryout daily activities in an automotive workshop while observing relevant work ethics and safety. It includes basic first-aid and fire-fighting procedures.

Unit assessment requirements/evidence requirements

This assessment can only be carried out in a real automotive workplace environment where automotive activities are carried out. Simulation is not allowed in this unit and level.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Project
- Work product (WP)

UNIT 002: HEALTH, SAFETY AND ENVIRONMENT (HSE) IN AUTOMOTIVE INDUSTRY

LO (Learning outcome)		**Performance Criteria**	Evidence Type					Evidence Ref Page number			
LO 1: Personal health and hygiene	1.1	Wear clean, smart and appropriate personal protective equipment (wears).									
	1.2	Work safely at all times, complying with health, safety and environmental regulations and guidelines.									
	1.3	Get cuts, grazes and wounds treated by the appropriate personnel.									
	1.4	Report any form of illness promptly to the appropriate personnel.									
LO2:											
Maintain personal health and hygiene	2.1	State own responsibility in the health and safety Act as it relates to own occupation.									
	2.2	State general rules on hygiene that must be followed.									
	2.3	State correct personal protection equipment (such as Head Protection, Foot Protection, Hand and body									

		protection) and regulatory protection.									
	2.4	State the importance of maintaining good personal hygiene.									
	2.5	Describe how to deal with cuts, grazes and wounds and why it is important to do so.									
LO3: Assist in the maintenance of a hygienic, safe and secure workplace											
	3.1	State the importance of working in a healthy, safe and hygienic workplace.									
	3.2	Report any accidents or near misses quickly and accurately to the proper personnel.									
	3.3	Follow health, hygiene and safety procedure at work.									
	3.4	Practice emergency procedures during work.									
	3.5	Follow organizational security procedures and measures.									
	3.6	Ensure the disposal of waste and pollution control with organic and inorganic waste disposal methods.									
	3.7	Follow noise control and protection methods.									
LO4: Prevention of hazards in the work place											
	4.1	Identify any potential hazards/hazards and deal with these correctly.									
	4.2	Explain where information about health, safety and environment in the workplace can be obtained.									
	4.3	Describe the types of hazard in the workplace that may occur and how to deal with them.									

4.4	Explain hazards that can be dealt with personally and those that should be reported to the appropriate personnel.									
4.5	Explain how to warn other people about potential hazards/hazards and why this is important.									
4.6	Explain why accidents and near-accidents should be reported and to whom.									
4.7	Describe the types of emergencies that may happen in the workplace and how to deal with it.									
4.8	Explain where to find the firstaid equipment and who the registered first responder is in the work place									
4.9	Explain safe lifting and handling techniques that should be followed.									
4.10	Explain other ways of working safely that are relevant to own position and why they are important.									
4.11	Describe organizational emergency procedures, in particular fire, and how these should be followed.									
4.12	State the possible causes of fire and how to minimize the possibility of fire in the workplace.									
4.13	State where to find the alarms and how to set them off.									
4.14	State the importance of following the fire safety laws and why it should never be approached unless it is safe to do so.									
4.15	Describe the organizational security procedures and why these are important.									

	4.16	Explain the importance of reporting all incidents to the appropriate personnel.									

Learners Signature: Assessors Signature: IQA Signature (if sampled)	**Date:** Date: Date:
EQA Signature (if sampled)	**Date:**

UNIT 003: FASTENING (JOINING) TECHNIQUES USED IN AUTOMOTIVE SERVICES AND REPAIR OPERATIONS

Unit reference number: NADDC/AM/L2/003
QCF level: 2
Credit value: 3
Guided learning hours: 30 HOURS

Unit Purpose:

This unit is about joining materials effectively using metal joining and fastening techniques.

Unit assessment requirements/evidence requirements:

This assessment can only be carried in a real workplace environment in which automotive service, repair, and mechanical joining by fastening operations are carried out.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Work product (WP)
- Recognition of Prior Learning

Unit 003: FASTENING (JOINING) TECHNIQUES USED IN AUTOMOTIVE SERVICES AND REPAIR OPERATIONS

LO (Learning outcome)	Performance Criteria:-		Evidence Type					Evidence Ref Page number			
LO 1: Safety precautions required in metal joining and fastening	1.1	State safety precautions required in metal joining and fastening									
	1.2	Explain the procedures involved in metal joining and fastening operations									
	1.3	Use the appropriate Personal Protective Equipment (PPE) when carrying out metal joining operations.									
	1.4	Carry out metal joining and fastening operations following Health and Safety requirements.									
	1.5	Protect the motor vehicle when carrying out metal joining operations.									

	1.6	Ensure that the tools, equipment and PPE required are in a safe working condition.									
	1.7	Work in a way to avoid damage to other components of the motor vehicle while carrying out metal joining and fastening.									
	1.8	Protect the repaired area to prevent corrosion where applicable.									
	1.9	Clean and store PPE and equipment in appropriate manner.									
LO2: Tools and equipment for carrying out metal joining operations											
	2.1	Select and use correct tools and equipment for carrying out metal joining operations.									
	2.2	Ensure that the tools, equipment and PPE required are in a safe working condition.									
	2.3	Ensure stability of tools and material before use.									
LO3: Metal Joining and fastening: Types, materials, applications and techniques.											
	3.1	Prepare material and align to enable suitable joint to be achieved.									
	3.2	Treat meeting/lapping members before joining.									
	3.3	Set up equipment to carry out metal joining operations: check suitability of joining technique check suitability of tooling check if consumables are correct									
	3.4	Identify and remedy joint defects.									
	3.5	Check integrity of the joint(s). ie visual inspection etc.									
	3.6	Carry out metal joining operations within the agreed timescale.									

	3.7	Identify common fastener failures									

Learners Signature: Assessors Signature: IQA Signature (if sampled)	**Date:** Date: Date:
EQA Signature (if sampled)	**Date:**

UNIT 004: INTRODUCTION TO GAS-POWERED VEHICLES

Unit reference number: NADDC /GPV/L2/004
QCF level: 1
Credit value: 2
Guided learning hours: 20HOURS

Unit Purpose:
This qualification is about introduction to gas-powered vehicles.

Unit assessment requirements/evidence requirements:
This assessment can only be carried in a real workplace environment where automotive and gas-powered vehicles service and repair operation are carried out. Live engines and functional vehicles shall be provided.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Project
- Work product (WP)

UNIT 004: INTRODUCTION TO GAS-POWERED VEHICLES

LO (Learning outcome)		Performance Criteria:-	Evidence Type					Evidence Ref Page number			
LO 1: Overview of Fuels	1.1	List the different types of fuels used in vehicles									
	1.2	Discuss the history of autogas									
	1.3	Explain the safety measures and regulations provided by Statutory bodies (ISO, SON, etc) regarding Autogas Conversion Kits installation.									
	1.4	Explain the various fuel properties listed in 1.1 above.									
	1.5	Identify areas of applications of the various fuels listed in 1.2									
	1.6	Explain the difference between: ❖ CNG ❖ LPG									
		❖ LPG									
	1.7	Explain the Physical Characteristics and Properties of Autogas (CNG/LPG/LNG)									
	1.8	Explain the physical differences between the tanks used in Autogas conversion									
	1.9	Explain the fundamentals of Combustion Air/Fuel Ratio									

	2.10	Explain the term Octane Ratings									
	2.11	Identify and explain Engine Performance and Engine Maintenance and Life									
LO2 : Introduction to Gas-Powered Vehicles Fuel System Layout											
	2.1	List the components/kits of gas-powered vehicle fuel system									
	2.2	Explain the basic functions of the components/kits listed in 2.1									
	2.3	Differentiate between the tanks used in LPG and CNG powered vehicles.									
	2.4	Identify the applications of gaseous fuels in vehicles e.g. cars, trucks, heavy duty vehicles									
	2.5	Explain the reasons for the use of different sizes of pipes in the conversion process									
	2.6	Identify the tools for cutting the pipes above									
LO 3 Basic Combustion Process											
	3.1	Explain the basic combustion process of conventional spark ignition engine.									
	3.2	Explain the basic combustion process of conventional compression ignition system									
	3.3	Explain the basic combustion process of gas-powered vehicles.									
LO4 Explain Vehicle Inspection and											
	4.1	Explain the requirements for conversion									
Testing	4.2	Describe Pre-Conversion Checklist									
	4.3	Describe Pre-Conversion Checklist									
	4.4	Describe Pre-Conversion Test Drive									

	4.5	Explain the conditions for Converting high-mileage Vehicles									
LO5 Describe Basic pre conversion documentations											
	5.1	Vehicle Sign-In Form—All Vehicles									
	5.2	Vehicle Checklist After Customer Sign-In.									
	5.3	Check the Engine and Driveline and report to the appropriate personnel									
LO 6 Introduction to Conversion kits/components											
	6.1	Map out/plan kit installation on the vehicle									
	6.2	Explain the different types/categories of ❖ Tanks ❖ Multivalve ❖ Filling valves ❖ Tube/pipe used for Autogas conversion									
	6.3	Explain the functions and working principles of: ❖ Electronic valves and gauges ❖ mechanical valves and gauges									
	6.4	Explain the function and operating principles of pressure reducer/vaporizer									
	6.5	Explain the working principles of injectors									
	6.6	List the types of sensors used in Autogas kits									
	6.7	Explain the functions of the the sensors in 6.6									
LO7 Recognize and install Electrical Harness and Circuit Drawing											
	7.1	Explain the electrical drawings of the installation manual									
	7.2	Explain the need for good practice in wire connection, soldering and termination									

	7.3	Identify different electrical components used in the conversion process									
	7.4	Explain the need for continuity testing using multimeter									
	7.5	Describe the use of electric soldering iron									
	7.6	Describe the use of wire stripper and different wire connection techniques									
	7.7	the use of different types of pipe cutting tools									
	7.8	Identify the different wires in the wire harness									

Learners Signature:	**Date:**
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	**Date:**

UNIT: 005: INTRODUCTION TO CONVERSION (GAS POWERED VEHICLES)

Unit reference number:	**NADDC /GPV/L2/005**
QCF level:	**2**
Credit value:	**3**
Guided learning hours:	**30**

Unit Purpose: This qualification is about identifying Auto Gas Vehicle Kits, ensuring that the necessary 'check' activities are carried out before mounting of the necessary components.

Unit assessment requirements/evidence requirements:

This assessment can only be carried in a real workplace environment in which automotive service and repair operations are carried out. Live engines and functional vehicles shall be provided.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Project
- Work product (WP)

UNIT 005: INTRODUCTION TO CONVERSION

LO (Learning outcome)		Criteria:-	Evidence Type					Evidence Ref Page number			
LO 1: Kits Identification	1.1	Identify different kits available									
	1.2	List the functions of the various kits									
	1.3	Identify the location of safety valves in the kits									
	1.4	Work in a way to minimize risks associate with ECU damage, mild electric shock and accident									
LO2: Pre-check Activities											
	2.1	Use suitable personal protective equipment (PPE) throughout the activities									
	2.2	Use Vehicle Sign-In Form—All Vehicles									
	2.3	Use Vehicle Checklist After Customer Sign-In.									
	2.4	Ensure battery terminals are disconnected in the right order before any activity									
	2.5	Identify the relevant vehicle details: Engine Power Ratings Vehicle kits ratings									

	2.6	Describe the need for kits and vehicle suitability									
	2.7	Scan vehicle									
LO 3: Introduction to Mounting of Mechanical Kits											
	3.1	Use suitable personal protective equipment (PPE)throughout the activities									
	3.2	According to manufacturer's specifications, identify: ❖ markings and labels of components ❖ Location of markings of labels ❖ Labels under various codes									
	3.3	Ensure battery terminals are disconnected in the right order before any activity									
	3.4	Identify suitable location for mounting of kits (mapping out)									
	3.5	Explain why best choice place are preferred during mount activity (mapping out)									
	3.6	Assist to carry out 'Mount' Activities: ❖ ECU ❖ Reducer/Regulator ❖ multivalves ❖ De-filter ❖ Injectors ❖ Wire harnesses ❖ Solenoid, etc.									
LO4: Check-Activities											
	4.1	Observe the supervisor/trainer and ensure there is no danger to: ❖ Bonnet ❖ Existing Components (If possible, snap engine before retrofitting)									
	4.2	Assist to check and ensure that all components(kits) are well fitted to avoid failure									

	4.3	Assist to ensure that the ECU is mounted before Electrical connections are done and powered.									
	4.4	Assist to ensure that all activities are carried out in line with manufacturer specifications.									

Learners Signature: Assessors Signature: IQA Signature (if sampled)	**Date:** Date: Date:
EQA Signature (if sampled)	**Date:**

UNIT: 006: MECHANICAL AND ELECTRICAL TRIM (MET) COMPONENTS IN A MOTOR VEHICLE

Unit reference number: NADDC/AM/L2/006
QCF level: 2
Credit value: 3
Guided learning hours: 30

Unit Purpose:

This unit is about the appropriate and fit and fitting of basic Mechanical, Electrical and Trim (MET) Components to motor vehicles. It is also about checking the operation (s) of the components fitted

Unit assessment requirements/evidence requirements

This assessment can only be carried out in a real automotive workplace environment in which the removal and fitting of basic mechanical, electrical and trimming of components are carried out.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Work product
- Recognition of Prior Learning

UNIT 006: MECHANICAL AND ELECTRICAL TRIM (MET) COMPONENTS IN A MOTOR VEHICLE

LO (Learning outcome)	Performance Criteria:-		Evidence Type					Evidence Ref Page number			
LO1: Description and selection of MET components	1.1	Identify MET components and their applications									
	1.2	Select the appropriate basic MET components to be fitted									
	1.3	Remove basic MET components in accordance with manufacturer's specifications.									
	1.4	Store all removed components safely in the correct location									
	1.5	Fit basic MET components in accordance with manufacturer's specifications.									
	1.6	Check that the components fitted operate correctly following in									
		accordance with manufacturer's specifications.									
	1.7	Remove and fit basic MET components within the agreed timescale									

LO2: Tools and equipment for dismantling and fitting MET components	2.1	Select and use the correct tools and equipment for the components to be remove or fit									
	2.2	Ensure that the tools and equipment required are in a safe working condition									
LO3: Dismantling and fitting of MET components											
	3.1	Use the appropriate personal protective equipment when removing and fitting basic MET components									
	3.2	Remove and fit basic MET components following; removal and fitting procedures manufacturers' instructions your workplace procedures Health, Safety and Environment and legal requirements									
	3.3	Work in a way to avoid damage to other components and units on the motor vehicle									
	3.4	Check that the components fitted operate correctly in accordance with manufacturer specifications.									
	3.5	Report any additional faults observed during the course of work to the relevant personnel promptly									

Learners Signature:	**Date:**
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	**Date:**

UNIT 007: TEAM WORK

Unit reference number:	**NADDC /AM /L2/007**
QCF level:	**1**
Credit value:	**1**

Guided learning hours: 10

Unit Purpose:

The purpose of this unit is to impart to the learner, skills, knowledge and understanding required to develop team spirit and positive working relationship.

Unit assessment requirements/evidence requirements

Assessment must be carried out in real workplace environment in which automotive services and repair operations are carried out. Simulation is not allowed in this unit and level.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Work product (WP)
- Recognition of Prior Learning (RPL) Professional Discussion (PD)

UNIT 007: TEAM WORK

LO (Learning outcome)	Performance Criteria		Evidence Type					Evidence Ref Page number			
LO1: Positive working relationship with colleagues	1.1	Identify the need for developing positive relationship with colleagues.									
	1.2	Recognize the importance of relating with other people in a way that makes them feel valued and respected.									
	1.3	Assist team members when required.									
	1.4	Report to the appropriate personnel when request/requesting for assistance fall outside area of responsibility.									
	1.5	Communicate information to colleagues about own work that might affect others.									
LO2:											

Take Responsibilities within the team	2.1	Recognize own role and responsibilities within the team.									
	2.2	Perform individual tasks in line with the team rules and regulations.									
	2.3	Participate effectively in teamwork.									
LO3: Compliance with organizational policies											
	3.1	Work In line with organizational standard and structure.									
	3.2	Use organizational code of practice.									
	3.3	Explain organizational code of conduct.									

Learners Signature:	**Date:**
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	**Date:**

Unit reference number: NADDC/AM/L2/008
QCF level: 1
Credit value: 2
Guided learning hours: 20
Unit Purpose:

This unit is to provide the necessary skills and competency required for computer usage in the automotive industry.

Unit assessment requirements/evidence requirements

Assessment must be carried out in real workplace environment in which automotive services and repair operations are carried out. Simulation is not allowed in this unit and level.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Work product (WP)
- Recognition of Prior Learning (RPL)
- Professional Discussion (PD)
- Assignment (ASS)

UNIT 008: BASIC COMPUTER SKILLS IN AUTOMOTIVE INDUSTRY

LO (Learning outcome)		**Performance Criteria:-**	Evidence Type					Evidence Ref Page number			
LO 1: Computer Classification and operation	1.1	Identify computers according to usage, type and size.									
	1.2	Differentiate between analogue, digital and hybrid computers.									
	1.3	Identify and describe the various types of microcomputers.									
	1.4	Carryout a given assignment using the computer.									
LO 2: Use of computers in modern											
	2.1	Explain the roles of computer in modern motor vehicles.									

automobile workshops.	2.2	Explain the various applications of computer in automobile workshop.										
	2.3	Identify the characteristics and benefits of computer in automotive workshop.										
LO 3: Computer Hardware and Software												
	3.1	Identify and explain the functions of various hardware and software components of										
Elements		the computer.										
	3.2	Differentiate between operating system and application software.										
	3.3	Select application software for a particular operation.										
LO4: Basic computer Operation	4.1	Operate the keyboard using function keys, alphanumeric keys, numeric keys and control keys.										
	4.2	Carryout typing exercise on the computer.										

Learners Signature:	**Date:**
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	**Date:**

UNIT 009: MOTOR VEHICLE WHEEL ALIGNMENT OPERATIONS

Unit reference number: NADDC/AM/L2/009
QCF level: 2
Credit value: 2
Guided learning hours: 20

Unit Purpose:
This unit is about testing and adjusting wheel alignments to meet the required tolerances.

Unit assessment requirements/evidence requirements
This assessment can only be carried out in a real automotive workplace environment in which wheel alignment operations are carried out.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Work product
- Recognition of Prior Learning

UNIT 009: MOTOR VEHICLE WHEEL ALIGNMENT OPERATIONS

LO (Learning outcome)		Performance Criteria:-	Evidence Type					Evidence Ref Page number			
LO1: Need for Wheel Alignment Operations	1.1	State the purpose of the steering and suspension system.									
	1.2	State reasons for tyre wear.									

	1.3	State the function of the following: • Castor • Camber • (King Pin Inclination/Steering Angle Inclination) KPI/SAI • Toe-in • Toe-out.									
	1.4	Examine a given motor vehicle to ascertain the wheel alignment status.									
LO2: Alignment Pre-Checks											
	2.1	State the purpose of prealignment checks.									
	2.2	List the step-by-step procedures for pre-alignment checks.									
	2.3	Conduct all wheel alignment pre checks and wheel alignment operations following the correct technical data in accordance with									
		manufacturer's specifications. your workplace procedure Health, Safety and Environment requirements.									
LO3: Wheel Alignment Tools and Equipment											
	3.1	Identify and use various wheel alignment tools/equipment correctly.									
	3.2	Ensure that measuring and adjustment tools and equipment are safe and in good working condition.									
	3.3	Carry out all wheel alignment operations using suitable tools and equipment and the correct techniques.									
	3.4	Store tools and equipment in accordance with manufacturer's specifications.									
LO4:											

Wheel Alignment Procedures	4.1	Use suitable personal protective equipment and motor vehicle coverings throughout all wheel alignment operations.									
	4.2	Work in a way which minimizes the risk of damage to the motor vehicle and its systems.									
	4.3	Conduct all wheel alignment pre checks and four-wheel alignment operations following the correct technical data the manufacturer's instructions Workplace procedure Health, Safety and environment requirements.									
	4.4	Ensure final adjustment and settings are within tolerance.									
	4.5	Inform relevant personnel when tolerance is not achievable.									
	4.6	Make clear and suitable recommendations for any further action to the relevant authorities clearly and accurately.									
	4.7	Complete all wheel alignment operations within the agreed timescale.									
LO5: Alignment Post Checks											
	5.1	State the purpose of postalignment checks.									
	5.2	List the step-by-step procedures for postalignment checks.									
	5.3	Carry out post wheel alignment checks to ensure conformity to specifications.									

Learners Signature: Assessors Signature: IQA Signature (if sampled)	**Date:** Date: Date:
EQA Signature (if sampled)	**Date:**

UNIT 010: MOTOR VEHICLE WHEEL BALANCING OPERATIONS

Unit reference number: NADDC/AM/L2/010
QCF level: 2
Credit value: 2
Guided learning hours: 20

Unit Purpose:

This unit is about testing and adjusting motor vehicle wheels balancing to meet the required rotational specification.

Unit assessment requirements/evidence requirements

This assessment can only be carried out in a real automotive workplace environment in which wheel balancing operations are carried out with addition of weights and counter-weights.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Work product
- Recognition of Prior Learning

UNIT 010: MOTOR VEHICLE WHEEL BALANCING OPERATIONS

LO (Learning outcome) Criteria:-		**Performance**	Evidence Type					Evidence Ref Page number			
LO1: Wheel alignment and balancing operations	1.1	Differentiate between wheel alignment and balancing.									
	1.2	Define the following • Dynamic unbalance • Static unbalance Toe-in • Toe-out, etc.									
	1.3	State the effects of: Tyre under inflation Tyre over inflation.									
	1.4	State the purpose of the steering and suspension system									
	1.5	Examine a given motor vehicle (while driving) to ascertain the wheel balancing status.									
	1.6	Explain the effects of unbalanced wheel while driving a given motor vehicle.									
LO2: Wheel balancing tools and equipment											
	2.1	Identify and use various wheel balancing tools/equipment correctly.									
	2.2	Ensure that measuring and adjustment tools and equipment are safe and in good working condition.									
	2.3	Carry out wheel balancing activities using suitable tools and equipment and the correct techniques.									
	2.4	Store tools and equipment according to manufacturer's specification.									
LO3:											

Pre-balancing checks	3.1	State the purpose of prebalancing checks									

	3.2	List the step-by-step procedures for pre-balancing checks									
	3.3	Conduct wheel balancing pre checks operations viz; the correct technical data the manufacturer's instructions workplace procedure Health, Safety and Environment requirements									
LO4: Wheel balancing procedures											
	4.1	Use suitable personal protective equipment and motor vehicle coverings throughout wheel balancing operations.									
	4.2	Work in a way which minimizes the risk of damage to the motor vehicle and its systems.									
	4.3	Conduct wheel balancing prechecks operations following the correct technical data the manufacturer's instructions workplace procedure Health, Safety and Environment requirements.									
	4.4	Identify the various values on the tyre for: • Rim size • Width • Tyre classification • Tyre diameter • Tyre direction of rotation mark • Tyre wall • Tyre bead • Tyre liner • Tyre pressure, etc.									
	4.5	Ensure final adjustment and settings are within the tolerance allowed for the motor vehicle and statutory and regulatory requirement.									
	4.6	Inform the relevant personnel when adjustments within the tolerances are not possible.									

	4.7	Make clear and suitable recommendations for any further action to the relevant personnel clearly and accurately.									
	4.8	Complete all four wheel balancing operations within the agreed timescale.									
LO5: Explain post balancing checks											
	5.1	State the purpose of postbalancing checks.									
	5.2	List the step-by-step procedures for post-balancing checks.									
	5.3	Carry out post wheel balancing checks to ensure conformity to specifications.									

Learners Signature:	**Date:**
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	**Date:**

UNIT 011: PERIODIC MAINTENANCE SERVICE

Unit reference number: NADDC /AM/L1/011

QCF level: 1
Credit value: 2
Guided learning hours: 20 HOURS

Unit Purpose:

This unit is about conducting routine examination, adjustment and replacement activities as part of the periodic servicing of motor vehicles.

Unit assessment requirements/evidence requirements:

This assessment can only be carried in a real workplace environment in which automotive service and repair operation are carried out in a workshop environment effectively. Live engines and functional motor vehicles shall be provided.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Project
- Work product (WP)

UNIT 011: PERIODIC MAINTENANCE SERVICE

LO (Learning outcome)		Performance Criteria:-	Evidence Type					Evidence Ref Page number			
LO 1: Construction and application of filters	1.1	List and identify the various types of filters and their components.									
	1.2	Identify different filters and the filtrations system (paper filters, fabric, cyclone, wiremesh filters, etc.)									
	1.3	Identify the application of pre-filtration and filtration systems.									
	1.4	Identify and apply correct specifications and tolerances for the vehicle when making assessments of system and component performance.									
	1.5	Work in a way which minimizes the risk of damage to the vehicle filtration and its systems and the surrounding area									
LO2: Procedures for conducting a lubrication service											
	2.1	Use manufacturer's routine maintenance checklist accurately									
	2.2	Use suitable personal protective equipment and vehicle coverings throughout all vehicle maintenance activities									

	2.3	Identify and ensure vehicle's systems and components complies with the following; The manufacturer's approved examination methods Your workplace procedures Health, Safety and environment requirements									
	2.4	Use only the correct specifications and tolerances for the vehicle when making assessments of system and component performance									
LO 3 Demonstrate procedure for servicing an engine											
	3.1	Use suitable personal protective equipment and vehicle coverings throughout all maintenance activities									
	3.2	Use suitable sources of technical information to support all your vehicle maintenance activities									
	3.3	Measure the vehicle's systems and components following: The manufacturer's approved examination methods Your workplace procedures Health, Safety Environment requirements									
	3.4	Ensure your examination methods identify accurately any vehicle system and component problems falling outside the specified maintenance schedule									

	3.5	Disable and re-assemble components in a way which minimizes the risk of damage to the vehicle and its systems.									
	3.6	Use suitable and accurate testing methods to evaluate the performance of all replaced and adjusted components/systems.									
	3.7	Promptly communicate any problems or issues relating to the vehicle's condition or conformity to the relevant personnel.									
	3.8	Ensure that maintenance records are accurate, complete and passed to the relevant personnel promptly in the format required.									
	3.9	Identify and use appropriate diagnostic tools and equipment for routine vehicle maintenance.									
	3.9.1	Communicate any anticipated delays in completion to the relevant personnel.									
	3.9.2	Perform all vehicle maintenance activities within the agreed timescale.									
LO 4 Demonstrate procedure for Carrying out Maintenance on Gas powered vehicles											
	4.1	List the types of maintenance required in gas-powered vehicles									
	4.2	Carry out visual inspections on gas-powered vehicles to identify the following: - Leakage - Loose connections - Vibrations - etc.									
	4.3	Identify worn out or defective components									

Learners Signature: Assessors Signature: IQA Signature (if sampled)	**Date:** Date: Date:
EQA Signature (if sampled)	**Date:**

LEVEL III

Summary of Level III

MANDATORY NOS

S/NO/ UNIT NO	REFERENCE NO.	NOS TITLE	CREDIT VALUE	GUIDED LEARNING HOURS	REMARKS
1	NADDC/GPV/L3/001	Health, Safety and Environment In Automotive Industry	2	20	
2	NADDC/GPV/L3/002	Communication Process in a Work Environment	1	10	
3	NADDC/GPV/L3/003	Team-Work	1	10	
4	NADDC/GPV/L3/004	Customer Relations in an Automotive Service & Repair workshop	4	40	
5	NADDC/GPV/L3/005	Automotive Electrical/ Electronic Components Rectification	6	60	
6	NADDC/GPV/L3/006	Motor vehicle Diagnosis	6	60	
7	NADDC /GPV/L3/007	GPV Layout Design	4	40	
8	NADDC /GPV/L3/008	GPV Kits & Fuelling System Installation	5	50	
9	NADDC /GPV/L3/009	Maintenance of GPV	5	50	
TOTAL CREDIT VALUE/ LEARNING HOURS			**34**	**340**	

OPTIONAL NOS

S/NO	OPTIONAL NOS	NOS TITLE	CREDIT VALUE	GUIDED LEARNING HOURS	REMARKS

10	NADDC/GPV/L3/010	Motor vehicle Electrical System Enhancement Installation	4	40	
11	NADDC/GPV/L3/011	Basic Power-train & Rolling Chassis Diagnostics	5	50	
TOTAL CREDIT VALUE/ LEARNING HOURS			**9**	**90**	

NOTE: Learners are required to select one (1) units from the optional units.

UNIT 001: HEALTH, SAFETY AND ENVIRONMENT (HSE) IN AUTOMOTIVE INDUSTRY

Unit reference number: NADDC/GPV/L3/001
QCF level: 3
Credit value: 2
Guided learning hours: 20

Unit Purpose: This unit is about the knowledge and skills needed to competently carryout daily activities in an automotive workshop while observing relevant work ethics and safety. It includes basic first-aid and fire-fighting procedures**.**

Unit assessment requirements/evidence requirements

This assessment can only be carried out in a real automotive workplace environment where automotive activities are carried out. Simulation is not allowed in this unit and level.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Project
- Work product (WP)

UNIT 001: HEALTH, SAFETY AND ENVIRONMENT (HSE) IN AUTOMOTIVE INDUSTRY

LO (Learning Outcome)		Criteria:-	Evidence Type					Evidence Ref Page number			
LO1 Recognise how to maintain personal health and hygiene	1.1	Carry out the responsibility in health and safety Act as it relates to own occupation									
	1.2	State general rules on hygiene that must be followed									
	1.3	Adapt correct personal protection equipment (PPE) such as head protection, foot protection, hand and body protection and respiratory protection.									
	1.4	State the importance of maintaining good personal hygiene									
	1.5	Describe how to deal with cuts, grazes, and wounds and why it is important to do so									
LO2 Carry out Personal Health and Hygiene Regulations and Guidelines											
	2.1	Use appropriate personal protective equipment (PPE)									
	2.2	Work safely at all times, complying with health and safety regulations and guidelines									
	2.3	Ensure workplace injuries are treated by certified first technicians and or personnel.									
	2.4	Report illness and infection promptly to the appropriate persons.									
LO3 Assist to maintain a hygienic, safe											
	3.1	State the importance of working in a healthy, safe and hygienic workplace									

and secure workplace	3.2	Report any accident or near accident (s) quickly and accurately to the proper person									
	3.3	Report any unsafe acts and or conditions (s) quickly and accurately to the proper person									
	3.4	Assist other workers to observe health, hygiene and safety procedure during work									
	3.5	Practice emergency procedures during work									
	3.6	Follow organizational security procedures									
	3.7	Ensure the disposal of waste and pollution control with organic and inorganic waste disposal methods.									
	3.8	Assist others to observe sound and noise control and protection methods.									
LO4 Carry out preventive measures against hazards in the work place											
	4.1	Identify any hazard or potential hazards and deals with these correctly									
	4.2	Explain where information about health and safety in own workplace can be obtained.									
	4.3	Describe the types of hazards in workplace that may occur and how to deal with them									
	4.4	Explain hazards that can be dealt with personally and those that should be reported to someone else									
	4.5	Explain how to warn other people about hazards and why this is important									
	4.6	Explain why any accident and near accident should be reported and who they should be reported to									

	4.7	Describe the types of emergencies that may happen in the workplace and how to deal with each of them									
	4.8	Locate where to find the firstaid equipment and who the registered first aider is in the work place									
	4.9	Demonstrate safe lifting and handling techniques that should be followed.									
	4.10	Demonstrate other ways of working safely that are relevant to own position and why they are important.									
	4.11	Describe organizational emergency procedure, in particular, fire, and how these should be observed									
	4.12	Describe periodic chart for emergency for safety and needs for muster point.									
	4.13	State the possible causes for fire in the workplace									
	4.14	Describe how to minimize the possibility of fire in the workplace									
	4.15	State where to find the alarms and how to set them off									
	4.16	State why a fire should never be approached unless it is safe to do so									
	4.17	State the importance of observing the fire safety laws									
	4.18	Describe the organizational security procedures to access by unauthorized person.									
	4.19	Explain the importance of reporting all usual or nonroutine incidents to the appropriate personnel.									

Learners Signature: Assessors Signature: IQA Signature (if sampled)	**Date:** Date: Date:
EQA Signature (if sampled)	**Date:**

UNIT 002: COMMUNICATION PROCESS IN AN AUTOMOTIVE ENVIRONMENT

Unit reference number: NADDC/GPV/L3/002
QCF level: 3
Credit value: 1
Guided learning hours: 10

Unit Purpose: To establish a quality communication system that is responsive and subject to change in meeting workers and employers need, in work environment.

Unit assessment requirements/evidence requirements

This assessment can only be carried out in a real automotive workplace environment where automotive activities are carried out.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Project
- Work product

UNIT 002: COMMUNICATION PROCESS IN AN AUTOMOTIVE ENVIRONMENT

LO (Learning outcome)		Performance Criteria:-	Evide ıce Type					Evidence Ref Page number			
LO1: Non-complex communication system in a work environment	1.1	Use a simple verbal means to pass on necessary information.									
	1.2	Use non-verbal means to pass on necessary information e.g. body language.									
	1.3	Identify and explain symbols and signs appropriately.									
LO2: Information source identification in a work environment.											
	2.1	Identify the source of information in an organization and work environment.									
	2.2	Relate appropriately with the source of information.									
	2.3	Use the various information flow systems in a work environment.									
	2.4	Use information sources to address challenges in a work									
		environment.									
	2.5	Communicate findings in accordance to procedure in a work environment.									
LO3: Use of communication methods in a work environment											
	3.1	Identify the various methods of communication in the work environment.									
	3.2	Use effectively, the various methods of communication in a work environment and communicate effectively to the right personnel.									
	3.3	Observe information effectively using symbols, signs and codes.									
	3.4	Observe instructions in line with ethics of the work environment.									

Learners Signature: Assessors Signature: IQA Signature (if sampled)	**Date:** Date: Date:
EQA Signature (if sampled)	**Date:**

UNIT 003: TEAM WORK

Unit reference number: NADDC /GPV /L3/003
QCF level: 3
Credit value: 1
Guided learning hours: 10

Unit Purpose:

The purpose of this unit is to impart to the learner, skills, knowledge and understanding required to develop team spirit and positive working relationship.

Unit assessment requirements/evidence requirements

Assessment must be carried out in real workplace environment in which automotive services and repair operations are carried out. Simulation is not allowed in this unit and level.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment

- Witness Testimony (WT)
- Personal statement (PS)
- Work product (WP)
- Recognition of Prior Learning (RPL) Professional Discussion (PD)

UNIT 003: TEAM WORK

LO (Learning outcome)	Performance Criteria:-		Evidence Type					Evidence Ref Page number			
LO1: Positive working relationship with colleagues	1.1	Identify the need for developing positive relationship with colleagues.									
	1.2	Recognize the importance of relating with other people in a way that makes them feel valued and respected.									
	1.3	Assist team members when required.									
	1.4	Report to the appropriate personnel when request/requesting for assistance fall outside area of responsibility.									
	1.5	Communicate information to colleagues about own work									
		that might affect others.									
LO2: Take Responsibilities within the team											
	2.1	Recognize own role and responsibilities within the team.									
	2.2	Perform individual tasks in line with the team rules and regulations.									
	2.3	Participate effectively in teamwork.									
LO3: Compliance with organizational policies											
	3.1	Work in line with organizational standards and structure.									
	3.2	Use organizational codes of practice.									
	3.3	Explain organizational codes of conduct.									

Learners Signature: Assessors Signature: IQA Signature (if sampled)	**Date:** Date: Date:
EQA Signature (if sampled)	**Date:**

UNIT 004: CUSTOMER RELATIONS IN AN AUTOMOTIVE SERVICE & REPAIR WORKSHOP

Unit reference number: NADDC/GPV/L3/004
QCF level: 3
Credit value: 4
Guided learning hours: 40 HOURS

Unit Purpose:

This unit is about gaining information from customers on their perceived needs, ascertain the scope of work, giving advice and information and agreeing a course of action, contracting for the agreed work and completing all necessary records and instructions.

Unit assessment requirements/evidence requirements

This assessment can only be carried out in a real automotive workplace environment.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Work product
- Recognition of Prior Learning (RPL)
- Professional Discussion (PD)

UNIT 004: CUSTOMER RELATIONS IN AN AUTOMOTIVE SERVICE & REPAIR WORKSHOP

LO (Learning outcome)		Criteria:-	Evidence Type					Evidence Ref Page number			
LO1: Contact with Customers	1.1	Accommodate customer in safe, non-active and comfortable place									
	1.2	Perform the following activities: Vehicle sign-in form Vehicle checklist after sign-in									
	1.3	Document customers' needs assessment as necessary									
	1.4	Discuss vehicle status with customer:									
LO2: Discuss and determine customers' needs											
	2.1	Certify that recording system are complete, accurate, in the required format (electronic/manual) and signed by the customer when necessary									
	2.2	Discuss and agree with the customer the type(s) of kit that can be installed on vehicle									
	2.3	Inspect and record Under-Hood Modifications (Photo-Document), Trunk or BedMounted Auxiliary Equipment (Photo-Document), Electrical and emission system									

LO3 Pre-conversion activities											
	3.1	Perform the underlisted preconversion activities: • Discussion with customers on the type(s) of kits to be installed • Vehicle sign-in • Vehicle inspection Scanning and recording									
	3.2	Explain the different types/categories of Tanks, Multivalve, filling valves and tube/pipe used for both Autogas (CNG/LPG/LNG)									
	3.3	Explain the functions and working principles of electronic and mechanical valves and gauges									
	3.4	Explain the function and operating principles of pressure reducer/vaporizer									
	3.5	Explain the working principles of electronic injectors, pressure sensor, temperature sensor and other types of sensors used in the conversion processes									
LO4: Deliver customer service											
	4.1	Discuss and record the following with the customer before accepting the vehicle: ❖ The physical inventory of the car ❖ The extent and nature of the work undertaken ❖ The terms and conditions of acceptance ❖ The timeframe									
	4.2	Discuss with customers on the accurate, current and relevant									
		advice and information on: ❖ Suitable vehicle inspection, repair/parts replacement ❖ Potential course of action ❖ The consequences of the action ❖ The estimated cost									

	4.3	Discuss safety measures with customers handing over converted vehicle.									
LO5: Carry out customers' follow up service											
	5.1	Seek further customer approval where the contracted agreement is likely to be exceeded									
	5.2	Describe how to get feedback from customers									
	5.3	Carry out customer necessary satisfaction survey									
	5.4	Advise customer on the appropriate gas type (CNG/LNG/ LPG									
	5.5	Obtain customer feedback on completed jobs									
	5.6	Analyze customer feedback.									

Learners Signature:	**Date:**
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	**Date:**

UNIT 005: AUTOMOTIVE ELECTRICAL/ELECTRONICS COMPONENTS/SYSTEMS RECTIFICATION

Unit reference number: NADDC/GPV/L3/005
QCF level: 3
Credit value: 6
Guided learning hours: 60 hours

Unit Purpose:

This unit identifies the competences needed to carryout fault diagnosis of automotive electrical and electronic components in accordance with approved procedures. It involves the application of the following six point's diagnostic techniques;

- Fault Verification
- Data Compilation

- Data Evaluation
- Testing
- Fault Amendment
- Final testing/amendment confirmation/certification.

Unit assessment requirements/evidence requirements

Assessment must be carried out in real workplace environment in which automotive services and repair operations are carried out. Simulation is not allowed in this unit and level.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Work product (WP)
- Recognition of Prior Learning (RPL)
- Professional Discussion (PD)

UNIT 005: AUTOMOTIVE ELECTRICAL/ELECTRONICS COMPONENTS/SYSTEMS RECTIFICATION

LO (Learning outcome)	Performance Criteria:-		Evidence Type					Evidence Ref Page number			
LO1: Operational Principles of Automotive ElectricalElectronics Components/ systems	1.1	Identify and access motor vehicle electrical/electronic components/systems.									
	1.2	Differentiate between electrical and electronics components/systems.									
	1.3	Analyze the operations of each of the components/systems.									
LO2: Diagnostic Tools and Equipment											
	2.1	Select and use appropriate diagnostic techniques, tools and aids to locate faults.									
	2.2	Operate motor vehicle diagnostic tools and equipment.									

	2.3	Store diagnostic tools and equipment safely and in line with manufacturer's specification.									
	2.4	Update diagnostic tools/ equipment as at when due and in line with manufacturer's specification.									
LO 3: Safe working practices in Automotive Electrical/ Electronic components Diagnosis											
	3.1	Work safely at all times, complying with health and safety and other relevant regulations and guidelines.									
	3.2	Demonstrate safe handling and storage of the diagnostic tools and equipment.									
	3.3	Work in a way which minimizes the risk of damage to other motor vehicle system, components, units, and the environment.									
LO4: Automotive Electrical / Electronics Systems Faults Repair											
	4.1	Troubleshoot to establish the most likely cause(s) of the faults.									
	4.2	Select and use appropriate diagnostic techniques, tools and aids to locate faults.									
	4.3	Rectify the identified faults using appropriate methods and techniques.									
	4.4	Demonstrate procedures for retrieving, interpreting and erasing fault codes.									
	4.5	Demonstrate the procedures for printing a selection of information from a data base.									
	4.6	Apply procedures for interpreting electrical wiring diagrams.									

Learners Signature: Assessors Signature: IQA Signature (if sampled)	**Date:** Date: Date:
EQA Signature (if sampled)	**Date:**

UNIT 006: MOTOR VEHICLE DIAGNOSIS

Unit reference number: NADDC/GPV/L3/006
QCF level: 3
Credit value: 6
Guided learning hours: 60

Unit Purpose:
This unit is about diagnosing and rectifying faults occurring in the mechanical, electrical/ electronics, communication, hydraulic and pneumatic systems of a motor vehicle.

Unit assessment requirements/evidence requirements
This assessment can only be carried out in a real automotive workplace environment where automotive activities are carried out. Assessment will require the provision of functional motor vehicles, stationary live engines, as well as assorted engine components.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Work product (WP)
- Recognition of Prior Learning (RPL)
- Professional Discussion (PD)

UNIT 006: MOTOR VEHICLE DIAGNOSIS

LO (Learning outcome)		Performance Criteria:-	Evidence Type					Evidence Ref Page number			
LO1: Working Principle of an Engine	1.1	Identify different types of engine									
	1.2	Identify the 2 and 4 stroke cycle of engine operation.									

	1.3	Identify and explain the following: ❖ The stroke cycle ❖ Spark and compression ignition engines ❖ Mechanical and electrical/electronic components of an engine.									
	1.4	Identify and explain hydraulic and engine fluid components.									
	1.5	Identify and explain the differences between hybrid and alternative fuel engines									
LO2: Tools and Equipment Used In Engine Diagnosis and Rectification											
	2.1	Identify various diagnostic tools and equipment.									
	2.2	Differentiate between Original Equipment Manufacturers (OEM) tool from Generic Diagnostic Equipment (GDE).									
	2.3	Use manufacturer's instructions to prepare, connect and test all the required equipment prior to use.									
	2.4	Use relevant equipment correctly and safely throughout all diagnostic and rectification activities.									
	2.5	Observe manufacturer's specification to store and secure all tools and equipment.									
LO3: Engine faults analysis and											
	3.1	Use appropriate personal protective equipment and motor vehicle coverings when carrying out diagnostic and rectification activities.									

rectification techniques	3.2	Support in the identification of faults, by reviewing motor vehicle: ❖ Diagnostic test procedures. ❖ Technical data									
	3.3	Identify and explain the different communication systems used in motor vehicles.									
	3.4	Identify and record any system deviation from acceptable limits accurately.									
	3.5	Assess to ensure that the dismantled sub-assemblies, components and units are intact.									
	3.6	Identify the condition and suitability of the components/units in 3.5 above for repair or replacement.									
	3.7	Carry out all diagnostic and rectification activities following:									
		❖ Manufacturers' instructions ❖ Recognized repair methods ❖ Workplace procedures ❖ Health, Safety and Environment requirements.									
	3.8	Measure and adjust components/units correctly to ensure that they operate to meet system requirements.									
	3.9	Use testing methods which are suitable for assessing the performance of the system rectified.									
	3.10	Demonstrate the procedures for interpreting electrical wiring diagram.									
	3.11	Demonstrate the procedures for retrieving and erasing fault codes.									
	3.12	Describe procedures for interpreting readings related to direct, indirect and intermittent faults.									
	3.13	Carryout procedures for repairing and replacing electrical and electronically controlled system components.									

	3.14	Ensure the engine system rectified performs to the motor vehicle operating specification and any other legal requirements prior to return to the customer.									

Learners Signature: Assessors Signature: IQA Signature (if sampled)	**Date:** Date: Date:
EQA Signature (if sampled)	**Date:**

UNIT 007: GAS POWERED VEHICLE LAYOUT DESIGN

Unit reference number:	**NADDC/GPV/L3/007**
QCF level:	**3**
Credit value:	**4**
Guided learning hours:	**40**

Unit Purpose: This qualification is about identifying Auto Gas Vehicle Kits and ensuring that the necessary 'check' activities are carried out before mounting necessary components.

Unit assessment requirements/evidence requirements:
This assessment can only be carried in a real workplace environment in which automotive service and repair operations are carried out. Live engines and functional vehicles shall be provided.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Project

- Work product (WP)

UNIT 007: GPV LAYOUT DESIGN

LO (Learning outcome)		Criteria:-	Evidence Type					Evidence Ref Page number			
LO 1: Basic Vehicle Information	1.1	Locate the data link connector (DLC)									
	1.2	Locate the Vehicle Identification Number (VIN)									
	1.3	Determine Engine Capacity and Power rating									
	1.4	Determine the following vehicle information: ❖ number of cylinder, ❖ year of manufacture; ❖ name/brand of vehicle									
LO2: Read and Interpret GPV Diagrams											
	2.1	Interpret typical gas-powered vehicle installation diagram (refer to manufacturers specifications).									
	2.2	Perform Mapping out on the vehicle using installation (schematic) diagram									
	2.3	Identify which components are separate or combined using Checklist									
	2.4	Identify brand and manufacturer's standards on cylinder and other documents (e.g. CNG/LNG/LPG enquiry form, batch inspection report, hydro test report)									
LO3: Conversion Layout											
	3.1	Sketch the conversion layout plan									
	3.2	Identify the parts and location required									
	3.3	Mark out the appropriate location and suitable sizes following manufacturer manual for proper guidance									
LO4											

Installing Conversion Components	4.1	Explain the safety measures and regulations provided by Statutory bodies (ISO, SON, etc) regarding Autogas Conversion kits installation.										
	4.2	Demonstrate and interpret the electrical drawings										
	4.3	Demonstrate good practice in wire connection, soldering and termination										
	4.4	Identify different electrical components used in the conversion process										
	4.5	Carryout continuity testing with multimeter										
	4.6	Demonstrate the use of electric soldering iron										
	4.7	Demonstrate the use of wire stripper and different wire connection techniques										
	4.8	Demonstrate the use of different types of pipe cutting tools										
	4.9	Carryout Vehicle Interface during the conversion process										

Learners Signature:	**Date:**
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	**Date:**

UNIT 008: GPV KITS & FUELING SYSTEM INSTALLATION

Unit reference number: NADDC/GPV/L3/008
QCF level: 3
Credit value: 5
Guided learning hours: 50 hours

Unit Purpose: This qualification is about identifying Auto Gas Vehicle Kits, ensuring that the necessary 'check' activities are carried out before mounting of the necessary components.

Unit assessment requirements/evidence requirements:
This assessment can only be carried in a real workplace environment in which automotive service and repair operations are carried out. Live engines and functional vehicles shall be provided.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Project
- Work product

UNIT 008: GPV KITS & FUELING SYSTEM INSTALLATION

LO (Learning outcome)		Criteria:-	Evidence Type					Evidence Ref Page number			
LO 1: Mechanical Kits Installation	1.1	Observe and put to use suitable personal protective Equipment throughout the work process									
	1.2	Explain the safety measures and regulations provided by statutory bodies (ISO, SON, etc) regarding Autogas Conversion Kits installation.									

1.3	Identify these components: • Filters • Reducers/ • Multivalves • Injector nozzles • Pipes, □ Regulator, • SGI Swith, etc.									

1.4	In accordance with manufacturer's specifications, identify the locations for the following: • Tank • Multivalves Filling point/valve with connecting gas hoses, etc									
1.5	Locate and utilize existing holes (Where available) or drill new holes and provide bolts and nuts for mounting: • Reducers • injector rail, • ECU • Solenoid valves • Reducer/vaporiser • Mulvalve, etc • Sensor SGI switch (Change over switch), etc..									
1.6	Prepare the Reducer by connecting the inlet valves, gauges.									
1.7	Connect the gas inlet/outlet and coolant pipes to the reducer									
1.8	Connect the filter and Gas injector rails using appropriate pipes and clips									
1.9	Prepare the Gas Injector rail and mount it using appropriate brackets									
1.10	Drill and tap the manifold at appropriate locations and									

		angles using appropriate drill bit and tap									
	1.11	Secure the nozzles on the manifold using lock tight adhesive									
	1.12	Connect the Injector rail assembly and Injector Nozzles fitting.									
	1.13	Interpret vehicle information for capacity and the calculation for right nozzle size.									
	1.15	Carryout the calculation for drilling nozzle hole on manifold.									
	1.16	Demonstrate the ability to									
		select appropriate drill bit and drilling the appropriate injector nozzle.									
LO 2: Install Gas Tank and Mechanical Valves											
	2.1	Explain the differences between the Autogas (CNG/LNG/LPG) tanks									
	2.2	Select the right type of tank for the vehicle to be converted									
	2.3	Explain the relationship between tilting cylindrical tank and the multivalve									
	2.4	Carryout these operations: Select the appropriate location to fix tank ❖ Tools/equipment to drill holes ❖ Install tank and fix the tank bracket									
	2.5	Carryout pipe cutting and connection of pipes during the conversion process									
	2.6	Firmly fasten and secure the tank belt									
	2.7	Demonstrate skills in Gas and Heat-Shrink Tubing and routing									

	2.8	Discuss the advantages and disadvantages of locations filling valve/ports in different locations									
	2.9	Explain the advantages and disadvantages of different types of Tank for conversion.									
	2.10	Explain the advantages and disadvantages of different filling valve locations.									
	2.11	Explain and install different types/sizes of pipes									
	2.12	Install different types of Valves and their functions									
	2.13	Use appropriate tools to cut and connect different types of pipes (as provided by regulations or OEM requirement)									
LO3: Install and check Fuel Transfer Lines											
	3.1	Explain the Standards for selecting right hose/pipe for different applications									
and Fuel-Line Connectors	3.2	Describe the functions of different Types of Hose/pipes									
	3.3	Carryout fuel line mounting and Routing									
	3.4	Describe the functions of tapered thread fittings and Sealants									
	3.5	Describe the functions of Fuel Line Fittings									
	3.6	Explain the Requirements for Additional Fuel-Line									
	3.7	Carryout pipe cutting using appropriate tools and techniques									
	3.8	Carry out leak test using appropriate instrument.									
	3.9	Describe the Standards for selecting right hose/pipe for different applications									

	3.10	Describe venting system									
	3.11	Describe types of pressure relief devices (PRDs) channel configurations									
	3.12	Explain probable modifications of PRDs									
LO4: Install and Test Electrical Wiring and Components											
	4.1	Locate where to read pressure ratings on components									
	4.1	Install Gas Electronic Computer Units (ECU) based on vehicle type and characteristics									
	4.2	Demonstrate the use of OEM electrical installation diagrams and guide.									
	4.3	Apply guidelines for bundling and routing the wire harness during conversion.									
	4.4	Demonstrate good wire connection and insulation practice.									
	4.5	Install Fuel rails and injectors									
	4.6	Install Fuel rail pressure and temperature sensors									
	4.7	Install Manifold absolute pressure (MAP) sensor									
	4.8	Connect the emulation cables									
		and other cables to vehicle's: ❖ Petrol Injectors, ❖ Ignition coil, ❖ Crank Position sensor, ❖ Cam position sensor (In accordance to the OEM electrical Circuit diagrams).									
	4.9	Install GAS ECU and make all connections to the Battery locations									
	4.10	Identify other Wiring harness and switches.									

LO5: Electrical/Electronic Kits Installation											
	5.1	Carryout all electrical connections using manufacturers recommended electrical schematic diagram: • ECU • Injector cables • SGI Gas switch • Reducer/vaporizer • Regulator • Multivalve Solenoid, etc									
	5.2	Observe and put to use suitable personal protective Equipment throughout the work process									
	5.3	Demonstrate good practice in wire connection, soldering and termination									
	5.4	Explain different electrical components used in the electrical wiring									
	5.5	Carryout continuity testing with multimeter									
	5.6	Carry out test/ emulation for signals of the following; • fuel injectors • Oxygen sensors MAP sensors, etc.									
	5.7	Carryout test to distinguish between: ❖ the negative cables to injector coils and the positive cables to switch (near the driver)									
	5.8	Demonstrate the use of wire stripper and different wire connection techniques									
LO 6: Fuel Tank											
	6.1	How to determine if pressure reading from label matches component pressure ratings									
	6.2	Determine the system pressure rating from the vehicle label									

Installation	6.3	Locate shut off valves (In accordance with NFPA52 or manufacturer's specifications)									
	6.4	How hard to you twist the shut off valve handle before you stop?									
	6.5	According to manufacturer's specifications, identify: ❖ markings and labels of components ❖ Location of markings of labels Labels under various codes									
	6.6	Carryout a trial fit in accordance with manufacturer specifications.									
	6.7	Firmly fasten fuel tank in place									
	6.8	Ensure valves (multi-valves and filling port/valves) are in proper position									
	6.9	Ensure that the fuel tank is properly mounted and firmly guarded in line with safety/regulatory requirements									
	6.10	Carryout connections in the proper order (refer to manufacturers instruction): • connect the Hose from the filling valve to the tank, and • from the tank down to the front kits (gas line)									

Learners Signature: Assessors Signature:	**Date:** Date:
IQA Signature (if sampled)	Date:

EQA Signature (if sampled)	Date:

UNIT 009: MAINTENENANCE OF GAS-POWERED VEHICLES.

Unit reference number: NADDC /GPV/L3/009
QCF level: 3
Credit value: 5
Guided learning hours: 50 HOURS

Unit Purpose:
This qualification is about the maintenance of gas-powered vehicles.

Unit assessment requirements/evidence requirements:
This assessment can only be carried in a real workplace environment where automotive and gas- powered vehicles maintenance and repair operations are carried out. Live engines and functional vehicles shall be provided.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Project
- Work product (WP)

UNIT 009: MAINTENENANCE OF GAS-POWERED VEHICLES.

LO (Learning outcome)		Performance Criteria:-	Evidence Type					Evidence Ref Page number			
LO 1: Maintenance of Gas-Powered Vehicles	1.1	Discuss the term maintenance of gaspowered vehicles									
	1.2	Discuss the types of maintenance of Auto gaspowered vehicles									
	1.3	Select tools and equipment used on gas-powered vehicles									
LO2: Performing Maintenance											
	2.1	Demonstrate health and safety procedures in carrying out maintenance procedures									

Checks of Gas-Powered Vehicle LO 3: Procedures for Functionality and Durability.	2.2	Identify the different components requiring maintenance in gaspowered vehicles: ❖ gas tanks,									
		❖ gas filters, ❖ faro connectors, ❖ pipes, ❖ reducers, ❖ multi-valves, ❖ nozzles, etc.									
	2.3	Select the tools for maintenance of gaspowered vehicles in-line with manufacturer's specifications									
	2.4	Carryout maintenance activities on the components listed in accordance with manufacturer specifications.									
	2.5	Interpret customers feedback/carryout root cause analysis of repetitive complaints									
	2.6	Check for leakages									
	2.7	Write a report on the maintenance activities and submit to the appropriate authority.									
	3.1	Carryout post-checks on the maintained units									
	3.2	Carryout drivability checks.									
	3.3	Carryout diagnosis to identify any faults recorded.									

Learners Signature:	**Date:**
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:

EQA Signature (if sampled)	Date:

UNIT 010: MOTOR VEHICLE ELECTRICAL SYSTEM ENHANCEMENTS AND INSTALLATION

Unit reference number:	**NADDC/AM/L3/010**
QCF level:	**3**
Credit value:	**4**
Guided learning hours:	**40**

Unit Purpose:
This unit is about fitting electrical features and components to enhance the original motor vehicle features and specification to meet customer requirements.

Unit assessment requirements/evidence requirements
This unit identifies the competences needed to carryout fault diagnosis of motor vehicle electrical and electronic unit and components, in accordance with approved procedures. It involves the application of the following six point's diagnostic techniques;

- Verify the fault
- Collect further information
- Evaluate the evidences
- Carryout further tests in a logical sequence
- Rectify the fault
- Assessment method will include
- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Work product
- Recognition of Prior Learning (RPL)
- Professional Discussion (PD)

UNIT 010: MOTOR VEHICLE ELECTRICAL SYSTEM ENHANCEMENTS AND INSTALLATION

LO (Learning outcome)	Performance Criteria:-	Evidence Type		Evidence Ref Page number

LO 1: Motor vehicle Electrical System Enhancement and their Operations	1.1	Explain the purpose of electrical enhancements									
	1.2	Identify the already installed electrical enhancements in a motor vehicle									
	1.3	Discuss the advantages and disadvantages of fitting electrical enhancements in a motor vehicle.									
	1.4	Interpret the manufacturers' requirements for properly fitting electrical enhancements in the particular motor vehicle.									
	1.5	Explain the working principle of various electrical									
		enhancements.									
	1.6	Describe the legal requirement for fitting electrical enhancements.									
LO2: Tools And Equipment Used In Motor vehicle Electrical System Enhancement											
	2.1	List and identify types of tools and equipment used.									
	2.2	Describe the enhancement tools and equipment.									
	2.3	Carryout the preparation and testing of all the tools and equipment required, following manufacturers' instructions.									
	2.4	Use tools and equipment in line with manufacturer's specification.									
	2.5	Observe safety in storing and securing.									
LO3: Customer Needs And Requirements											
	3.1	Assemble components which are compatible with the motor vehicle specification and customer requirements.									
	3.2	Monitor to ensure that all enhancements function to specification prior to release to the customer.									

	3.3	Implement all enhancement activities within the agreed timescale.									
	3.4	Communicate any anticipated delays in completion to the appropriate personnel promptly.									
LO4: Motor vehicle Electrical System Enhancements.											
	4.1	Observe safety and work ethics with suitable personal protective equipment and the use of motor vehicle coverings throughout all enhancement activities.									
	4.2	Carry out all electrical enhancement activities following: manufacturers' instructions your workplace procedures Health, Safety and Environment legal requirements									
	4.3	Adopt workshop rules and regulations to minimize the risk of: • damage to other motor vehicle systems • damage to other components and units • contact with leakages • contact with hazardous substances • damage to the environment									
	4.4	Use manufacturer's specification to adjust the components fitted and motor vehicle systems correctly for effective operation.									
	4.5	Inspect to ensure all enhancements function to specification prior to release to the customer									
	4.6	Carryout all enhancement activities within the agreed timescale									

	4.7	Communicate any anticipated delays in completion to the relevant authority promptly									

Learners Signature: Assessors Signature: IQA Signature (if sampled)	**Date:** Date: Date:
EQA Signature (if sampled)	**Date:**

UNIT 011: BASIC POWER-TRAIN & ROLLING CHASSIS DIAGNOSTICS

Unit reference number: NADDC/AM/L3/011
QCF level: 3
Credit value: 5
Guided learning hours: 50

Unit Purpose:
This unit is about identifying and rectifying electrical faults occurring within a variety of electrical systems within the powertrain and rolling chassis. It includes the procedures for inspecting and assessing the conditions and overhauling of the transmission system in line with manufacturers' specifications.

Unit assessment requirements/evidence requirements

This assessment can only be carried out in a real automotive workplace environment.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Work product (WP)
- Recognition of Prior Learning (RPL)
- Professional Discussion (PD)

UNIT 011: BASIC POWER-TRAIN & ROLLING CHASSIS DIAGNOSTICS

LO (Learning outcome)		Performance Criteria:-	Evidence Type					Evidence Ref Page number			
LO1: Motor vehicle Transmission and Chassis System Operations and Principles	1.1	Describe the principles of transmission system in an Auto gas-powered vehicle.									
	1.2	Explain the principles of chassis system.									
	1.3	Identify the components of the transmission system.									
	1.4	Identify the components of the chassis system.									
	1.5	Differentiate between transmission and chassis system.									
LO2: Chassis and Transmission Tools and Equipment											
	2.1	Identify chassis and transmission system tools and equipment.									
	2.2	Differentiate between Special Service Tools (SST) from other tools.									
	2.3	Use the tools and equipment required, correctly and safely throughout all service or repair activities.									
	2.4	Observe manufacturers									
		specification in storing and securing tools and equipment.									
LO3: Basic PowerTrain & Rolling Chassis Diagnostics											
	3.1	Use suitable personal protective equipment and motor vehicle coverings when applying electrical testing techniques and carrying out repairs.									
	3.2	Support in the identification of complex electrical faults, by reviewing motor vehicle: ❖ Diagnostic test procedures. ❖ Technical data									

	3.3	Use manufacturer's manual to prepare, and test all the required electrical and electronic components.									
	3.4	Carry out all repair activities following: ❖ Manufacturers' instructions ❖ Recognized repair methods ❖ Health, Safety and Environment requirements.									
	3.5	Use relevant tools and equipment correctly and safely throughout all repair activities									
	3.6	Ensure all repaired and replaced electrical components and units conform to the motor vehicle operating specifications and any legal requirements.									
	3.7	Adjust components and units correctly to ensure that they operate to meet system requirements.									
	3.8	Ensure the electrical system repair performs to the motor vehicle operating specification and any legal requirements prior to return to the customer.									
	3.9	Ensure records are accurate, complete and passed to the relevant personnel promptly in the format required.									
	3.10	Apply correct tools and equipment for inspecting and assessing the transmission system and its									
		associated components in line with manufacturers' specifications.									
	3.11	Demonstrate procedures for dismantling and assembling a transmission system and its associated components.									
	3.12	Demonstrate procedures for repairing and/or replacing component parts of a transmission system and its associated components.									

	3.13	Apply procedures for measuring and evaluating wear on component parts of the transmission system.									
	3.14	Demonstrate procedures for repairing and replacing automatic transmission system.									
	3.15	Demonstrate procedures for operational testing of automatic transmission system components.									
	3.16	Complete all system diagnostic activities within the agreed timescale.									

Learners Signature: Assessors Signature: IQA Signature (if sampled)	**Date:** Date: Date:
EQA Signature (if sampled)	**Date:**

LEVEL IV

Summary of Level IV

MANDATORY NOS

S/NO/ UNIT NO	REFERENCE NO.	NOS TITLE	CREDIT VALUE	TOTAL LEARNING HOURS	REMARKS
1	NADDC/GPV/L4/001	Communication Process in an Automotive Work Environment	1	10	
2	NADDC/GPV/L4/002	Health and Safety in Automotive Industry	2	20	
3	NADDC/GPV/L4/003	Motor vehicle Enhancement and Installation	5	50	
4	NADDC/GPV/L4/004	Team-Work	2	20	
5	NADDC/GPV/L4/005	Workshop Organization and Management	6	60	
6	NADDC/GPV/L4/006	Basic Computer Skills in Automotive Industry	2	20	
7	NADDC /GPV/L4/007	Calibration of Auto Gas-Powered Vehicles	6	60	
8	NADDC /GPV/L4/008	Final Inspection on Auto Gas Powered vehicles	4	40	
9	NADDC /GPV/L4/009	Maintenance of Auto GasPowered Vehicle's Fuel System and Components	5	50	
TOTAL CREDIT VALUE/ LEARNING HOURS			**33**	**330**	

OPTIONAL NOS

S/NO	OPTIONAL NOS	NOS TITLE	CREDIT VALUE	TOTAL LEARNING HOURS	REMARKS
10	NADDC/GPV/L4/010	Motor vehicle Electrical Unit And Component Faults Rectification	6	60	
11	NADDC/GPV/L4/011	Motor vehicle Electrical and Electronics System Faults Rectification	6	60	
12	NADDC/GPV/L4/012	Motor vehicle Engine and Component Faults Rectification	5	50	
13	NADDC/GPV/L4/013	Engine Re-Conditioning	6	60	
14	NADDC/GPV/L4/014	Mechanical Fastening Techniques used in Automotive Services and Repair Operation	3	30	
15	NADDC/GPV/L4/015	Customer Relations in an Automotive Work Environment	4	40	
16	NADDC/GPV/L4/016	Motor vehicle Electrical System Enhancement Installation	4	40	
17	NADDC/GPV/L4/017	Automotive Service Tools and Equipment	3	30	
TOTAL CREDIT VALUE/ LEARNING HOURS			**37**	**370**	

NOTE: Learners are required to select four (4) from the optional units.

UNIT 001: COMMUNICATION PROCESS IN AN AUTOMOTIVE WORK ENVIRONMENT

Unit reference number: NADDC/GPV/L4/001
QCF level: 4
Credit value: 1
Guided learning hours: 10

Unit Purpose:

This unit is about quality communication system that is responsive to workers, employers and customers need in work environment.

Unit assessment requirements/evidence requirements

Assessment must be carried out in real workplace environment in which automotive services and repair operations are carried out. Simulation is not allowed in this unit and level.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)

- Practical assessment (PA)
- Witness Testimony (WT)
- Personal statement (PS)
- Work product (WP)
- Recognition of Prior Learning (RPL)
- Professional Discussion (PD)

UNIT 001: COMMUNICATION PROCESS IN AN AUTOMOTIVE WORK ENVIRONMENT

LO (Learning outcome)		Performance Criteria	Evidence Type					Evidence Ref Page number			
LO1: Use a noncomplex communication system in a work environment	1.1	Use a simple verbal means to pass on necessary information									
	1.2	Use non- verbal means to pass on necessary information e.g. body language									
	1.3	Explain symbols and signs appropriately.									
	1.4	Use a simple verbal means to pass on necessary information									
	1.5	Interpret written communication: memos, newsletter, etc.									
LO2 Demonstrate the ability to source information in a work environment	2.1	Identify the source of information in an organisation and work environment									
	2.2	Explain appropriately the sources of information the work environment									
	2.3	Use the various information flow systems in a work environment									
	2.4	Use information to avoid challenges in a work situation									
	2.5	Communicate findings in accordance to procedure in the work environment.									

LO3: Use of communicating means in a work environment	3.1	Identify the various communication equipment in the work environment									
	3.2	Use effectively, the various communication equipment in the work environment									
	3.3	Communicate information effectively to the right personnel									
	3.4	Observe information effectively using symbols, signs and codes.									
	3.5	Obey instruction in line with ethics of the work environment.									

Learners Signature:	**Date:**
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	**Date:**

UNIT 002: HEALTH AND SAFETY IN AUTOMOTIVE INDUSTRY

Unit reference number: NADDC/GPV/L4/002
QCF level: 4
Credit value: 2
Guided learning hours: 20

Unit Purpose:

This unit is about the knowledge and skills needed to competently carryout daily activities in an automotive workshop while observing relevant work ethics and safety. It includes basic first-aid and fire-fighting procedures.

Unit assessment requirements/evidence requirements

Assessment must be carried out in real workplace environment in which automotive services and repair operations are carried out. Simulation is not allowed in this unit and level.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Work product (WP)
- Recognition of Prior Learning (RPL)
- Professional Discussion (PD)

UNIT 002: HEALTH AND SAFETY IN AUTOMOTIVE INDUSTRY

LO (Learning outcome)		Criteria:-	Evidence Type					Evidence Ref Page number			
LO 1 Personal health and hygiene	1.1	Use appropriate personal protective equipment (PPE).									
	1.2	Always work safely in line with occupational safety and health association standard (OSHA).									
	1.3	Ensure workplace injuries are treated by certified first aid technicians and or personnel									
	1.4	Report illness and infection promptly to the appropriate persons.									
	1.5	List contents of the first aid box and keep in an easily accessible place in the working environment.									
LO2 Maintain personal health and hygiene											
	2.1	State own responsibility health and safety act as it relates to electric vehicles work environment.									
	2.2	State general rules on hygiene									
		that must be followed in an electric vehicle working environment									
	2.3	Explain the following Personal Protection Equipment such as hard hat/head protection, foot protection, hand and body protection and regulatory protection on electric vehicles.									

	2.4	State the importance of maintaining good personal hygiene: clothing and environment									
	2.5	Explain the types of electric fire extinguishers and how to use them									
	2.6	Describe how to treat electric vehicle shocks, cuts, grazes, and wounds.									
	2.7	Describe the importance of giving first aid treatment to injured workers in an electric vehicle working environment.									
LO3 Housekeeping in an electric vehicle work environment.											
	3.1	Explain the importance of housekeeping									
	3.2	Identify tools and materials used for housekeeping.									
	3.3	Explain the consequences of not carrying out housekeeping in an electric vehicle working environment.									
	3.4	Remove and dispose components safely to meet legal workplace requirements									
	3.5	Carryout housekeeping in an electric vehicle work environment.									
	3.6	Store tyres and wheels, and other materials used on electric vehicle work environment in line with manufacturer's specifications									
LO 4 Preparation and preservation of workshop Surfaces.											
	4.1	Explain how to clean grease, oil, paints, thinners									
	4.2	Explain how to make workshop ready for work.									
	4.3	Detect vermin and carryout effective vermin control.									

LO 5											

Cleaning toxic and hazardous substances	5.1	Explain how to remove hazardous substances									
	5.2	Dispose solid and liquid wastes in line with relevant environmental laws									
	5.3	State the dangers associated with hazardous materials.									
LO6 Clearing of gangways/aisles and damaged insulations											
	6.1	Identify and remove damaged electric vehicles components on walkway									
	6.2	Identify and rearrange fire extinguishers, tools, etc on the gangway									
	6.3	Explain dangers associated with blocked gangways/aisles.									
	6.4	Clear exit and access ways.									
LO7 Report Housekeeping Hazards											
	7.1	Report a housekeeping hazards to supervisor.									
	7.2	Report identified housekeeping lapses to the supervisor.									
	7.3	Notify authority of potential oil and chemical spill and exposure of electric vehicle battery to unsafe condition.									
	7.4	Report chemical spill cleanup.									
LO8 Maintenance of hygienic, safe, and secure workplace											
	8.1	State the importance of working in a healthy, safe, and hygienic workplace									
	8.2	Report any accidents or near accidents quickly and accurately to the right authority/personnel.									
	8.3	Explain safe and unsafe acts									
	8.4	Follow health, hygiene and safely procedure during work									
	8.5	Practice emergency rescue procedures during work. Emergency Drill, Muster Point.									

	8.6	Follow organizational security procedures. Engagement of a environmental Safety Officer.									
	8.7	Ensure the disposal of unused cables and other materials.									
	8.8	Carryout manual and mechanical lifting of the available component(s)									
LO 9 Prevention of hazards in the work place											
	9.1	Identify any hazards or potential hazards and report to the appropriate authority									
	9.2	Explain where information about health and safety in your workplace can be obtained.									
	9.3	Describe the types of hazards in workplace that may occur and how to deal with them									
	9.4	Explain the hazards of high voltage energy that can be dealt with personally and those that should be reported to someone else									
	9.5	Explain how to warn other people about hazards and why this is important									
	9.6	Explain any accidents and near accidents should be reported and who they should be reported to									
	9.7	Describe the types of emergencies that may happen in the workplace and how to deal with it.									
	9.8	Explain where to find the firstaid equipment and who the registered first aider is in the workplace									
	9.9	Explain safe lifting and handling techniques that should be followed.									

9.10	Explain the dangers of the DC rapid charge if not properly connected and too hot										
9.11	Explain the failure of the good connections of the connector, interface or protocol between the charger and the vehicle										
9.12	Explain other ways of working safely that are relevant to own position and why they are important.										
9.13	Describe organizational emergencies procedure, in particular fire, and how these should be followed.										
9.14	State the possible causes for fire in an electric vehicle workplace										
9.15	State the possible causes for electric shock in the workplace										
9.16	Explain how to resuscitate possible heart failure/electric shock victim										
9.17	Describe how to minimize the possibility of fire in the workplace. Application of fire extinguishers.										
9.18	State where to find the alarms and how to set them off										
9.19	State why a fire should never be approached unless it is safe to do so										
9.20	State the importance of following the fire safety laws										
9.21	Describe the organizational security procedures and why these are important										
9.22	Explain battery safe working temperature for electric vehicles										
9.23	Explain the importance of reporting all usual or nonroutine incidents to the appropriate personnel.										

Learners Signature: Assessors Signature: IQA Signature (if sampled)	**Date:** Date: Date:
EQA Signature (if sampled)	**Date:**

UNIT 003: MOTOR VEHICLE ENHANCEMENT AND INSTALLATION

Unit reference number: NADDC/GPV/L4/003
QCF level: 4
Credit value: 5
Guided learning hours: 50

Unit Purpose:

This unit is about carrying out consultations with customers to investigate their concerns relating to electrical enhancements for their motor vehicle. It also includes making recommendations to ensure that the customer's concerns are addressed and explaining the outcomes that the enhancements will achieve so that customers fully understand the work that will be undertaken.

Unit assessment requirements/evidence requirements

Assessment must be carried out in real workplace environment in which automotive services and repair operations are carried out. Simulation is not allowed in this unit and level.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Work product (WP)
- Recognition of Prior Learning (RPL)
- Professional Discussion (PD)

UNIT 003: MOTOR VEHICLE ENHANCEMENT AND INSTALLATION

LO (Learning outcome)		Performance Criteria:-	Evidence Type					Evidence Ref Page number			
LO 1: Motor vehicle electrical system enhancement and their operation	1.1	Justify the need for vehicular enhancement and installations									
	1.2	Support in the identification of suitable motor vehicle enhancement installations by reviewing motor vehicle technical data.									
	1.3	Evaluate the manufacturer's requirement for motor vehicle enhancement installations.									
LO2											

Establish contact with customers and identify customer needs	2.1	Respond to customer's concerns in a positive and friendly manner.									
	2.2	Work in a way that will give positive impression on the customer.									
	2.3	Obtain sufficient, detailed information using suitably structured questions.									
	2.4	Carryout a suitable road test to obtain further detailed information on, or clarification of a customer's request.									
	2.5	Identify suitable motor vehicle enhancement installations, by reviewing motor vehicle customer requirements.									
	2.6	Give relevant technical advice and information to the customer.									
	2.7	Ensure that records are complete, accurate, in the format required and signed by the customer, where necessary.									
	2.8	Suggest possible methods for improving the customer care									

		process to your manager, when necessary									
LO3 Legal requirements and workplace procedures											
	3.1	Adhere to legal requirements relating to the motor vehicle enhancements installations									
	3.2	Record fault locations and correction activities carried out on a vehicle: ❖ Reporting the results of tests ❖ The referral of problems ❖ Reporting delays to the completion of work.									
	3.3	Analyze existing health and safety regulations and workplace procedures.									
	3.4	Document installation and enhancement information									
	3.5	Report anticipated delays to the relevant personnel.									

Learners Signature:	**Date:**
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	**Date:**

UNIT 004: TEAM WORK

Unit reference number: NADDC /GPV /L4/004
QCF level: 3
Credit value: 1
Guided learning hours: 10

Unit Purpose:

The purpose of this unit is to impart to the learner, skills, knowledge and understanding required to develop team spirit and positive working relationship.

Unit assessment requirements/evidence requirements

Assessment must be carried out in real workplace environment in which automotive services and repair operations are carried out. Simulation is not allowed in this unit and level.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Work product (WP)
- Recognition of Prior Learning (RPL) Professional Discussion (PD)

UNIT 004: TEAM WORK

LO (Learning outcome)		Performance Criteria	Evidence Type					Evidence Ref Page number			
LO1: Positive working relationship with colleagues	1.1	Identify the need for developing positive relationship with colleagues.									
	1.2	Recognize the importance of relating with other people in a way that makes them feel valued and respected.									
	1.3	Assist team members when required.									
	1.4	Report to the appropriate personnel when request/requesting for assistance fall outside area of responsibility.									

	1.5	Communicate information to colleagues about own work									
		that might affect others.									
LO2: Take Responsibilities within the team											
	2.1	Recognize own role and responsibilities within the team.									
	2.2	Perform individual tasks in line with the team rules and regulations.									
	2.3	Participate effectively in teamwork.									
LO3: Compliance with organisational policies											
	3.1	Work In line with organizational standard and structure.									
	3.2	Use organizational code of practice.									
	3.3	Explain organizational code of conduct.									

Learners Signature:	**Date:**
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	**Date:**

UNIT 005: WORKSHOP ORGANISATION AND MANAGEMENT

Unit reference number: NADDC/GPV/L4/005
QCF level: 4
Credit value: 6
Guided learning hours: 60

Unit Purpose:
This unit is to provide participants with the knowledge and skills to competently carryout effective work planning and administration in an automotive workshop.

Unit assessment requirements/evidence requirements
This assessment can only be carried out in a real automotive workplace environment. Simulation is not allowed in this unit and level.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Work product
- Recognition of Prior Learning (RPL)
- Professional Discussion (PD)

UNIT 005: WORKSHOP ORGANISATION AND MANAGEMENT

LO (Learning outcome)		Performance Criteria:-	Evidence Type					Evidence Ref Page number			
LO 1: Workshop Financial Records	1.1	Justify reasons for keeping financial records.									
	1.2	Describe various financial records used in a workshop: ❖ Receipts ❖ Invoices ❖ Work bills.									
	1.3	Differentiate between various financial records use in workshop: ❖ Receipts ❖ Invoices ❖ Work bills.									

	1.4	Manage procedures for preparing various financial records used in workshop.									
	1.5	Discuss procedures for safe and proper financial records									
		keeping.									
LO 2: Workshop job Related Records											
	2.1	Justify reasons for keeping job related records.									
	2.2	Describe and differentiate various job related records used in the workshop: ❖ Job cards ❖ Workshop reception forms ❖ Requisition forms ❖ Purchase order forms ❖ Stock cards, ❖ Workshop delivery forms, etc.									
	2.3	Demonstrate procedures for preparing various job related records used in the workshop.									
	2.4	Discuss procedures for safe and proper job related records keeping.									
LO 3: Procurement											
	3.1	Justify reason(s) for workshop procurement									
	3.2	Confirm the list of out-of-stock tools, materials and equipment.									
	3.3	Evaluate various storage techniques use in workshop.									
	3.4	Formulate procedures for procuring materials, tools and equipment following: ❖ Manuals and reference Materials ❖ Requests and approvals ❖ Order placements ❖ Reception of goods and Items ❖ Payments ❖ Storage ❖ Use.									

Learners Signature: Assessors Signature: IQA Signature (if sampled)	**Date:** Date: Date:
EQA Signature (if sampled)	**Date:**

UNIT 006: BASIC COMPUTER SKILLS IN AUTOMOTIVE INDUSTRY

Unit reference number: NADDC/GPV/L4/006
QCF level: 2
Credit value: 2
Guided learning hours: 20

Unit Purpose:
This unit is to provide the necessary skills and competency required for computer usage in the automotive industry.

Unit assessment requirements/evidence requirements
Assessment must be carried out in real workplace environment in which automotive services and repair operations are carried out. Simulation is not allowed in this unit and level.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Work product (WP)
- Recognition of Prior Learning (RPL)
- Professional Discussion (PD)
- Assignment (ASS)

UNIT 006: BASIC COMPUTER SKILLS IN AUTOMOTIVE INDUSTRY

LO (Learning outcome)		Performance Criteria:-	Evidence Type					Evidence Ref Page number			
LO 1: Computer Classification and operation	1.1	Identify computers according to usage, type and size.									
	1.2	Differentiate between analogue, digital and hybrid computers.									
	1.3	Identify and describe the various types of microcomputers.									
LO 2: Use of computers in modern											
	2.1	Explain the roles of computer in modern motor vehicles.									

automobile workshops.	2.2	Explain the various applications of computer in automobile workshop.									
	2.3	Identify the characteristics and benefits of computer in									
		automotive workshop.									
	2.4	Carryout a given assignment using the computer.									
LO 3: Computer Hardware and Software Elements											
	3.1	Identify and explain the functions of various hardware and software components of the computer.									
	3.2	Differentiate between operating system and application software.									
	3.3	Select application software for a particular operation.									
LO4: Principles of operations, capability and system requirement of a computer											
	4.1	Explain the principles of operation, capability and system requirements of a computer system									
	4.2	Explain the configuration of a computer system									
	4.3	List and explain various computer components and systems									
LO5: Basic computer Operation											
	5.1	Operate the keyboard using function keys, alphanumeric keys, numeric keys and control keys.									
	5.2	Carryout typing exercise on the computer.									
	5.3	Carryout a given assignment in a vehicle using the computer.									

Learners Signature: Assessors Signature: IQA Signature (if sampled)	**Date:** Date: Date:
EQA Signature (if sampled)	**Date:**

UNIT 007: CALIBRATION OF AUTO GAS-POWERED VEHICLES.

Unit reference number: NADDC /GPV/L4/007
QCF level: 4
Credit value: 3
Guided learning hours: 30 HOURS

Unit Purpose:
This unit is to provide the necessary knowledge and skills required to calibrate gaspowered vehicle electrical and mechanical units to ensure correct functionality.

Unit assessment requirements/evidence requirements:
This assessment can only be carried in a real workplace environment where automotive and gas-powered vehicles service and repair operation are carried out in a workplace environment effectively. Live engines and functional vehicles shall be provided.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Project
- Work product (WP)

UNIT 007: CALIBRATION OF AUTO GAS-POWERED VEHICLES

LO (Learning outcome) Performance Criteria:-	Evidence Type		Evidence Ref Page number

LO 1: Tools/Software for Calibration of GPV's	1.1	Explain the term calibration as it relates to gas-powered vehicle conversion									
		Discuss the operations: ❖ Personal Computer; ❖ OBDII tool									
	1.2	Discuss the reasons for calibration									
	1.3	Explain the procedures for carrying out calibration.									
	1.4	Discuss the safety precautions to be observed during calibration in accordance with manufacturer's specifications.									
	1.5	Select the right software, tools, equipment and materials required for calibration in accordance with manufacturer's specifications.									
	1.6	Use computer system to install the relevant calibration software									
LO2: Perform Calibration Operation											
	2.1	Explain Vehicle parameters and the standard values.									
	2.2	Analyze the different types of calibration softwares according to the gas medium.									
	2.3	Carryout connection of communication wire for different OEM Systems Calibration									
	2.4	Analyze the parameters displayed by calibration software in accordance with manufacturer's specifications.									
	2.5	Adjusting Parameters to meet the expected vehicle performance (In accordance with manufacturer's specifications).									

	2.6	Ensure correct filling of the gas (in accordance with manufacturer's specifications).									
	2.7	Ensure the safety of the vehicle, equipment, and the environment during calibration activities									
LO3: Manage Calibration Data and Information											
	3.1	Carryout real time calibration data collection									
	3.2	Explain the various components of a calibration system									
	3.3	Perform Parameter Basic settings of the gas controller. *(Car and system info, RPM, MAP press, Gas press, Red. Temp, Gas. Temp, Engine load, Lambda, gas injector type, oxygen sensor type, reducer temperature sensor, gas level indicator type, engine type, fuel type fuel type, injection control.)*									
	3.4	Perform Gas injectors settings,									
	3.5	Perform Auto-calibration and									
		LED switch operation									
LO4: Use OBD II scan tool											
	4.1	Setup based on observation of petrol injection pulses									
	4.2	Setup with an OBD scanner and STFT and LTFT trims of the ECU									
	4.3	Carryout Setting of maximum load									
	4.4	Perform Idle speed control tuning									
	4.5	Carryout other calibration documentations									

LO 5: Perform and supervise General Diagnosis	5.1	Explain and resolve and ratify “No operation on Autogas” problems									
	5.2	Explain and resolve and ratify “Fuel identification” problems									
	5.3	Explain and resolve and ratify “Excessive Gasoline consumption” problems after conversion									
	5.4	Explain and resolve and ratify “No automatic switch to Autogas” problems									
	5.5	Explain and resolve “No manual switch to gasoline” problems									
LO 6: Perform and supervise Fuel system Diagnosis											
	6.1	Explain and resolve “Automatic fuel switch during acceleration” problems									
	6.2	Explain and resolve “Gradual loss of power on Gas” problems									
	6.3	Explain and resolve problems associated with starting vehicle when “Out of gasoline”									
	6.4	Explain and resolve “No operation after refuelling” problems									
	6.5	Explain and resolve “Inaccurate fuel level gauge” problems									
	6.6	Explain and resolve “Check engine light” problems									
LO 7: Access and use Sequent Diagnostic Program											
	7.1	Carryout Data Visualization • Errors Diagnostic • Actuators • ECU Version									
	7.2	Interpret OBD-II parameter readouts									
	7.3	Carryout Actuator testing and Injector sequencing									

	7.4	Carryout Replacing an injector									
LO 8: Perform post-Check on Converted Auto Gas-Powered Vehicles.											
	8.1	Describe post-check activities on converted vehicles (visual inspection, leak checks, wiring connections, tightening, electronic diagnosis, test driving etc.)									
	8.2	Select the tools and equipment required for postchecks									
	8.3	Demonstrate the uses of the tools and equipment required for post-checks									
	8.4	Perform post-check activities calibration in accordance with manufacturer's specifications and standard practices.									
LO 9: Conduct General Testing and Inspection											
	9.1	Explain and resolve *Check engine light* and Stored P1649 trouble code									
	9.2	Accessing the Sequent Diagnostic Program									
	9.3	Performing Actuator testing and Injector sequencing									
	9.4	Replacing and maintaining an injector									
	9.5	Setting the Reducer outlet pressure and performing Gas purge or gas cap DTC									
LO 10: Perform Fuel system Diagnosis, Maintenance and repairs											
	10.1	Demonstrate First Approach to Diagnosis for Fuel lines									
	10.2	Explain and resolve problems of Poor performance, Slow refuelling and hard starting									
	10.3	Identify leaky fuel injector									
	10.4	Perform Injector removal procedure									
	10.5	Perform Tank evacuation components									

	10.6	Describe Fuel tank components									
	10.7	Explain and resolve “Check engine light” problems									
LO 11: Perform Sequential Injection System Diagnosis, Maintenance and repairs											
	11.1	Explain and resolve Stall on switchover and Automatic fuel switch during acceleration									
	11.2	Perform Lean or rich DTC Correction									
	11.3	Correct gradual loss of power and Engine misfires problems									
	11.4	Perform General Maintenance									
LO 12: Maintain Cylinder Inspection Guidelines & Procedures											
	12.1	Describe Fuel characteristics regarding pressure and flammability									
	12.2	Describe Safety related pressure system components									
	12.3	Perform Proper fuelling and defueling techniques									
	12.3	Demonstrate good Tank care & damage prevention procedures									
	12.4	Perform CNG delivery system diagnostics and									
	12.5	Demonstrate CNG container and plumbing diagnosis and repair procedures									
	12.6	Apply CNG leak detection techniques									

Learners Signature:	**Date:**
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	**Date:**

UNIT 008: FINAL INSPECTION ON AUTO GAS-POWERED VEHICLES.

Unit reference number: NADDC /GPV/L4/008
QCF level: 4
Credit value: 3
Guided learning hours: 30 HOURS

Unit Purpose:
This unit is to provide the necessary knowledge and skills required to perform final inspection on gas-powered vehicle fuel systems to meet safety/operational standards and regulations.

Unit assessment requirements/evidence requirements:
This assessment can only be carried in a real workplace environment where automotive and gas-powered vehicles service and repair operation are carried out. Live engines and functional vehicles shall be provided.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Project
- Work product

UNIT 008: FINAL INSPECTION ON GAS-POWERED VEHICLES

LO (Learning outcome)		Performance Criteria:-	Evidence Type					Evidence Ref Page number			
LO 1: Final Inspection of Gas-Powered Vehicles	1.1	Discuss the need for final inspection									
	1.2	Differentiate between maintenance, post-check and final inspection									
	1.3	Describe the procedure for carrying out final inspection.									
	1.4	Demonstrate the procedure for post-check and final inspection operations									
LO2:											

Interpret Final Inspection Checklist	2.1	Discuss the importance of parameters on final inspection checklist									
	2.2	Read the parameters on the final inspection checklist in									
		accordance with manufacturer's specifications.									
	2.3	Analyse the parameters on the final inspection checklist in accordance with manufacturer's specifications.									
LO 3: Application of Procedural Inspection Check list on gas-Powered Vehicles.											
	3.1	Using checklist, perform final inspection on gas tank, filling inlets and associated components									
	3.2	Use the checklist to perform final inspection on mechanical components									
	3.3	Use the checklist to perform final inspection on electronics and electrical components									
	3.4	Report findings of final inspection to the appropriate authority (s)									
LO 4: Explain Essentials element of documentation											
	4.1	Explain the Goals of documentation									
	4.2	Explain the Advantages of effective documentation									
	4.3	Explain the Risks of poor documentation									
	4.4	Apply the fundamentals of Informed consent									
	4.5	Identify and mitigate the Risks of poor documentation									
LO 5: Use Electronic records systems											
	5.1	Demonstrate the use electronic record systems									
	5.2	Maintain and operate electronic record system									

	5.3	Demonstrate the ability to access, use and navigate the different types of electronic record									
LO 6: Manage Job Card and Record Book											
	6.1	Demonstrate the ability to fill all information on the Job card									
	6.2	Ensure the record book and job card are kept correctly and securely									
	6.3	Communicate the summary of the job card and record book									
	6.4	Design and fill Work Orders									
	6.5	Opening a Work Order									
	6.6	Assigning a Work Order and Closing a Work Order									

Learners Signature:	**Date:**
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	**Date:**

UNIT 009: MAINTENENANCE OF GAS-POWERED VEHICLE FUEL SYSTEMS AND COMPONENTS.

Unit reference number: NADDC /GPV/L4/009
QCF level: 4
Credit value: 3
Guided learning hours: 30 HOURS

Unit Purpose:
This qualification is about the maintenance of gas-powered vehicles.

Unit assessment requirements/evidence requirements:
This assessment can only be carried in a real workplace environment where automotive and gas-powered vehicles maintenance and repair operation are carried out. Live engines and functional vehicles shall be provided.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Project
- Work product

UNIT 009: MAINTENENANCE OF AUTO GAS-POWERED VEHICLE FUEL SYSTEMS AND COMPONENTS.

LO (Learning outcome)	**Performance Criteria:-**		Evid ɜnce Type					Evidence Ref Page number				
LO 1: Maintenance of Auto Gas-Powered Vehicles	1.1	Discuss the term maintenance of gas-powered vehicles										
	1.2	Discuss the types of maintenance on gas-powered vehicles										
	1.3	Select tools and equipment used on auto gas-powered vehicles maintenance										

	1.4	Explain the importance of carrying out adjustments on the reducer									
LO2: Performing Maintenance Checks on Gas-											
	2.1	Demonstrate health and safety procedures in carrying out maintenance procedures									
Powered Vehicle	2.2	Identify and carryout maintenance on components requiring maintenance in Autogas-powered vehicles (e.g. gas tanks, gas filters, faro connectors, pipes, reducers, multivalve, nozzles, pressure relief devices (PRDs), etc.)									
	2.3	Select the tools for maintenance on gas-powered vehicles calibration in accordance with manufacturer's specifications.									
	2.4	Perform adjustments on the reducer in accordance with specifications									
	2.5	Carryout maintenance activities on the components listed calibration in accordance with manufacturer's specifications.									
	2.6	Interpret customers feedback/carryout analysis of repetitive complaints									
	2.7	Write a report on the maintenance activities and submit to the appropriate authority.									
	2.8	Discuss safety measure to be observed by customers with customers									
LO 3: Procedures for Functionality and Durability Test.											
	3.1	Carryout post-checks on the maintained units/components									
	3.2	Carryout drivability checks.									
	3.3	Carryout diagnosis to identify faults.									

	3.4	Document the result of diagnosis/repair/maintenance for future use									
LO 4 Perform Autogas/(CNG/LPG/LNG) Vehicle Fuel Containers decommissioning											
	4.1	Recognize importance of defueling, decommissioning and disposal of ***Autogas/(CNG/LPG/LNG)*** containers									
	4.2	Identify the types of containers									
	4.3	Describe owner responsibilities and requirements for safe removal and disposal consideration (4 steps)									
	4.4	Outline various safety requirements when working with ***Autogas/(CNG/LPG/LNG)***									
		Provide overview of the defueling process and methods									
	4.5	Outline how to safely purge a ***Autogas/(CNG/LPG/LNG)*** container									
	4.6	Describe what to do if you need to decommission a container that has a malfunctioning valve									
	4.7	Learn how to decommission a cylinder and render it useless for future use									
	4.8	Recognize how to properly dispose of a ***Autogas/(CNG/LPG/LNG)*** container									
LO 5: Perform Service and Maintenance on converted vehicles/equipment											
	5.1	Describe General Vehicle Requirements and General System Specifications									
	5.2	Perform Maintenance Schedule									
	5.3	Demonstrate the ability to install Maintenance Parts									
LO 6 Perform Repairs on converted vehicles/ equipment											
	6.1	Demonstrate the ability for Cylinder Inspection									
	6.2	Perform Cylinder Bracket and Isolator Inspection									
	6.3	Perform Collision Repairs									

Learners Signature: Assessors Signature: IQA Signature (if sampled)	**Date:** Date: Date:
EQA Signature (if sampled)	**Date:**

UNIT 010: MOTOR VEHICLE ELECTRICAL UNIT AND COMPONENT FAULTS RECTIFICATION

Unit reference number: NADDC/GPV/L4/010
QCF level: 4
Credit value: 6
Guided learning hours: 60 Hours

Unit Purpose:

This unit identifies the competences needed to carryout fault diagnosis of motor vehicle electrical/electronic unit and components, in accordance with approved procedures. It involves the application of the following diagnostic techniques:

- Verification of the fault
- Collection of further information
- Evaluation of the evidences
- Carrying out further tests in a logical sequence
- Rectification of the fault

Unit assessment requirements/evidence requirements

This assessment can only be carried out in a real automotive workplace environment.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Work product
- Recognition of Prior Learning (RPL)
- Professional Discussion (PD)

UNIT 010: MOTOR VEHICLE ELECTRICAL UNIT AND COMPONENT FAULTS RECTIFICATION

LO (Learning outcome)		Performance Criteria	Evidence Type					Evidence Ref Page number			
LO1: Motor vehicle Electrical/ Electronic Units, Components and Their Operations	1.1	Inspect motor vehicle electrical/electronic units and components.									
	1.2	Differentiate between electrical/ electronic units and components'									
	1.3	Inspect various electrical/ electronic units and components									
	1.4	Explain the operations of each of the units and components									
LO2:											
Diagnostic Tools and Equipment	2.1	Select and use appropriate diagnostic techniques, tools and aids to diagnose faults.									
	2.2	Operate motor vehicle diagnostic tools and equipment appropriately.									
	2.3	Store diagnostic tools and equipment safely in line with manufacturer's specification.									
	2.4	Update diagnostic tools/equipment as at when due and in line with manufacturer's specification.									
LO 3: Safe Working Practices In Motor vehicle Electrical / Electronics Units and Components											
	3.1	Work safely at all times, complying with health and safety and other relevant regulations and guidelines									
	3.2	Demonstrate safe handling and storage of the diagnostic tools and equipment.									
	3.3	Work in a way which minimizes the risk of damage to other motor vehicle systems, components, units, and the environment.									
LO 4:											

Rectification of motor vehicle electrical/electronic systems faults	4.1	Troubleshoot and establish the most likely cause (s) of the faults in the units and components.										
	4.2	Select and use appropriate diagnostic techniques, tools and aids to locate faults.										
	4.3	Rectify the identified faults using appropriate methods and techniques.										
	4.4	Demonstrate procedures for retrieving, interpreting and erasing fault codes in an electronic system.										
	4.5	Demonstrate the procedures for printing a selection of information from a data base.										
	4.6	Apply procedures for interpreting electrical wiring diagrams.										

Learners Signature:	**Date:**
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	**Date:**

UNIT 011: MOTOR VEHICLE ENGINE AND COMPONENENT FAULTS RECTIFICATION

Unit reference number: NADDC/GPV/L4/011
QCF level: 4
Credit value: 5
Guided learning hours: 50

Unit Purpose:
This unit is about diagnosing and rectifying faults occurring in the mechanical, electrical /electronics, communication, hydraulic and pneumatic systems of a motor vehicle.

Unit assessment requirements/evidence requirements
This assessment can only be carried out in a real automotive workplace environment where automotive activities are carried out. Assessment will require the provision of functional motor vehicles, stationary live engines, as well as assorted engine components.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Work product (WP)
- Recognition of Prior Learning (RPL)
- Professional Discussion (PD)

UNIT 011: MOTOR VEHICLE ENGINE AND COMPONENENT FAULTS RECTIFICATION

LO (Learning outcome)		Performance Criteria:-	Evidence Type					Evidence Ref Page number			
LO1: Working Principle of an Engine	1.1	Identify different types of engine									
	1.2	Identify the 2 and 4 stroke cycle of engine operation.									

	1.3	Identify and explain the following: ❖ The stroke cycle ❖ Spark and compression ignition engines, ❖ Mechanical and electrical/electronic									
		components of an engine.									
	1.4	Identify and explain hydraulic and engine fluid components.									
	1.5	Identify and explain the differences between hybrid and alternative fuel engines									
LO2: Tools and Equipment Used In Engine Diagnosis and Rectification											
	2.1	Identify various diagnostic tools and equipment.									
	2.2	Differentiate between Original Equipment Manufacturers (OEM) tools from Generic Diagnostic Equipment (GDE).									
	2.3	Use manufacturer's instructions to prepare, connect and test all the required equipment prior to use.									
	2.4	Use relevant equipment correctly and safely throughout all diagnostic and rectification activities.									
	2.5	Follow manufacturer's specification in storing and securing all tools and equipment.									
LO3: Engine faults analysis and rectification techniques											
	3.1	Use appropriate personal protective equipment and motor vehicle coverings when carrying out diagnostic and rectification activities.									

	3.2	Support in the identification of faults, by reviewing motor vehicle: ❖ Diagnostic test procedures. ❖ Technical data									
	3.3	Input the correct information necessary to enable accurate diagnosis of engine system faults.									
	3.4	Identify and explain the different communication systems used in motor vehicles.									
	3.5	Record any system deviation from acceptable limits									
		accurately.									
	3.6	Ensure that the dismantled sub-assemblies, components and units are intact.									
	3.7	Confirm their condition and suitability for repair or replacement.									
	3.8	Carry out all diagnostic and rectification activities following: ❖ Manufacturers' instructions ❖ Recognized repair methods ❖ Workplace procedures ❖ Health, Safety and Environment requirements.									
	3.9	Measure and adjust components/units correctly to ensure that they operate to meet system requirements.									
	3.10	Use testing methods which are suitable for assessing the performance of the system rectified.									
	3.11	Interpret electrical wiring diagrams.									

	3.12	Demonstrate the procedures for retrieving and erasing fault codes.									
	3.13	Interpret readings related to direct, indirect and intermittent faults.									
	3.14	Carryout procedures for repairing and replacing electrical and electronically controlled system components.									
	3.15	Carry out Pre-delivery inspection to ensure that the system rectified performs according to specification and any other legal requirements prior to return to the customer.									

Learners Signature:	**Date:**
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	**Date:**

UNIT 012: ENGINE RECONDITIONING

Unit reference number: NADDC/GPV/L4/012
QCF level: 4
Credit value: 6
Guided learning hours: 60

Unit Purpose:

This unit provides the needed knowledge and skill to competently recondition the engine in line with manufacture's requirement. It includes procedures for dismantling, reconditioning, reassembling engine sub-assemblies and components as well as checking engine operation against manufacturer's specification.

Unit assessment requirements/evidence requirements

Assessment must be carried out in real workplace environment in which automotive services and repair operations are carried out. Simulation is not allowed in this unit and level.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Work product (WP)
- Recognition of Prior Learning (RPL)
- Professional Discussion (PD)
- Assignment (ASS)

UNIT 012: ENGINE RECONDITIONING

LO (Learning outcome)		Performance Criteria:-	Evidence Type					Evidence Ref Page number			
LO 1:	1.1	Initiate good workshop practices applicable to engine dismantling procedure.									

General engine dismantling procedure	1.2	Supervise the cleaning and inspection during engine dismantling procedures.									
	1.3	Confirm tools and equipment used selected for dismantling.									
	1.4	Supervise the procedures for working with bolts and other fasteners.									
LO2:											

Procedures for dismantling and assembling engine sub-assemblies.	2.1	Certify the correct information, tools and equipment for dismantling and assembling of engine sub-assemblies.									
	2.2	Supervise the procedures for removing and installing the following: ❖ Auxiliaries, ❖ Attachments and ❖ External mechanical parts, prior to engine dismantling and assembly.									
LO 3: Procedures for reconditioning engine sub-assemblies											
	3.1	Access the information, tools and equipment for reconditioning an engine subassembly and associated components.									
	3.2	Supervise procedures of dismantling and assembling components parts of an engine sub-assembly.									
	3.3	Analyze the procedure for measuring and evaluating wear on components parts.									
	3.4	Supervise the procedure for repairing or replacing component part of an engine sub-assembly.									
	3.5	Supervise the procedures for rebuilding or reconditioning component parts.									

	3.6	Supervise the procedures for functionality testing of components.									
LO 4 Engine reconditioning post repair operations.											
	4.1	Access the information, tools, and equipment for checking engine post repair operations.									
	4.2	Monitor the fluid levels prior to starting.									
	4,3	Supervise the procedure for checking operation of gauges and warning devices prior to starting in line with manufacture's requirement.									
	4.4	Monitor the procedures for checking leaks and abnormal noises.									
	4.5	Confirm procedures for final inspection tests and adjustments in line with manufacturer's specification.									

Learners Signature:	**Date:**
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	**Date:**

UNIT 013: MECHANICAL FASTENING TECHNIQUES USED IN AUTOMOTIVE SERVICES AND REPAIR OPERATION

Unit reference number: NADDC/GPV/L4/013
QCF level: 2
Credit value: 2
Guided learning hours: 20 HOURS

Unit Purpose:
This unit is about joining materials effectively using metal joining and fastening techniques.

Unit assessment requirements/evidence requirements:
This assessment can only be carried in a real workplace environment in which automotive service, repair, and mechanical joining by fastening operations are carried out.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Work product (WP)
- Recognition of Prior Learning

UNIT 013: MECHANICAL FASTENING TECHNIQUES USED IN AUTOMOTIVE SERVICES AND REPAIR OPERATION

LO (Learning outcome)		Criteria:-	Evidence Type					Evidence Ref Page number			
LO 1: Safety precautions required in metal joining/fastening	1.1	Use the appropriate personal protective equipment when carrying out mechanical joining operations. Meaning and types of PPE									

and repair operations	1.2	Protect the vehicle and its contents effectively when carrying out mechanical joining operations. Caution with high voltage, moving, loose and vibrating parts									
	1.3	Ensure that the tools, equipment and PPE you require are right tools, in a safe working condition									
	1.4	Avoid damaging other components, units and panels on the vehicle									
	1.5	Protect the repaired area to inhibit corrosion where applicable									
	1.6	Clean and store PPE and equipment in appropriate manner. Restrict movement and personnel in work area									
	1.7	Carry out mechanical joining operations in line with health safety and legal requirements.									
LO2: Tools and equipment for carrying out mechanical joining operations and repair operations											
	2.1	Select and use the correct tools and equipment for carrying out mechanical joining operations, electric testing and fault code detection									
	2.2	Ensure that the tools, equipment and PPE you require are in a safe working condition									
	2.3	Identify types of tools to be use in mechanical joining operations and repairs									
LO3: Types of metal joining/fastening materials, their applications, and techniques											
	3.1	Assemble materials and align to enable suitable joint to be achieved									
	3.2	Treat meeting flanges before joining.									

	3.3	Set up your equipment to carry out mechanical joining operations ▪ check suitability of joining technique ▪ check suitability of tooling ▪ check consumables are correct									
	3.4	Recognise when your joint is not forming correctly and what action needs to be taken									
	3.5	Check integrity of the joint.									
	3.6	Carry out mechanical joining operations within the agreed time scale									
	3.7	Identify common fastener									
		failures. Familiarise with fastening constituent materials and properties. Educate on size-torque values									

Learners Signature:	**Date:**
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	**Date:**

UNIT 014: CUSTOMER RELATIONS IN AN AUTOMOTIVE WORK ENVIRONMENT

Unit reference number: NADDC/GPV/L4/014
QCF level: 3
Credit value: 4
Guided learning hours: 40 HOURS

Unit Purpose: To establish a quality communication system that is responsive and subject to change in meeting workers and employers need, in work environment.

Unit assessment requirements/evidence requirements
This assessment can only be carried out in a real automotive workplace environment where automotive activities are carried out.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Project
- Work product

UNIT 014: CUSTOMER RELATIONS IN AN AUTOMOTIVE WORK ENVIRONMENT

LO (Learning outcome)		Criteria:-	Evidence Type					Evidence Ref Page number			
LO1: Contact with Customers	1.1	Gather relevant information from the customer to make an assessment of their own and perceived vehicle needs									
	1.2	Recognise questions and clarifications from customers during conversation									

	1.3	Communicate agreement reached with customers in writing									
	1.4	Document customers' needs assessment as necessary									
	1.5	Accommodate customer in safe, non-active and comfortable place									
LO2: Discuss and determine customers' needs											
	2.1	Carry out accurate identification and clarification of customer and vehicle needs, by referring to: Vehicle data Operating procedure									
	2.2	Certify that recording system are complete, accurate, in the required format and signed by the customer when necessary									
	2.3	Test drive vehicle as necessary and listen to customer's complaint.									
LO3: Deliver customer service											
	3.1	Discuss and record the following with the customer before accepting the vehicle: ❖ The physical inventory of the car ❖ The extent and nature of the work undertaken ❖ The terms and conditions of acceptance ❖ The timeframe									
	3.2	Discuss with customers on the accurate, current and relevant advice and information on: ❖ Suitable vehicle inspection, repair/parts replacement ❖ Potential course of action ❖ The consequences of the action ❖ The estimated cost									

LO4: Carry out customers' follow up service	4.1	Seek further customer approval where the contracted agreement is likely to be exceeded									
	4.2	Describe how to get feedback from customers									
	4.3	Carry out customer necessary satisfaction survey									
	4.4	Obtain customer feedback on completed jobs									
	4.5	Analyze customer feedback.									

Learners Signature: Assessors Signature:	**Date:** Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	**Date:**

UNIT 015: MOTOR VEHICLE ELECTRICAL SYSTEM ENHANCEMENTS INSTALLATION

Unit reference number: NADDC/GPV/L4/015
QCF level: 3
Credit value: 4
Guided learning hours: 40

Unit Purpose:

This unit is about fitting electrical features and components to enhance the original motor vehicle features and specification to meet customer requirements.

Unit assessment requirements/evidence requirements

This unit identifies the competences needed to carryout fault diagnosis of motor vehicle electrical and electronic unit and components, in accordance with approved procedures. It involves the application of the following six point's diagnostic techniques;

- Verify the fault
- Collect further information
- Evaluate the evidences
- Carryout further tests in a logical sequence
- Rectify the fault

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Work product
- Recognition of Prior Learning (RPL)
- Professional Discussion (PD)

UNIT 015: MOTOR VEHICLE ELECTRICAL SYSTEM ENHANCEMENTS INSTALLATION

LO (Learning outcome)	**Performance Criteria:-**		Evidence Type					Evidence Ref Page number			
LO 1: Motor vehicle Electrical System Enhancement and	1.1	Explain the purpose of electrical enhancements									
	1.2	Identify the already installed electrical enhancements in a motor vehicle									

their Operations	1.3	Discuss the advantages and disadvantages of fitting electrical enhancements in a motor vehicle.									
	1.4	Interpret the manufacturers' requirement for properly fitting electrical enhancements in the particular motor vehicle.									
	1.5	Explain the working principle of various electrical enhancements.									
	1.6	Describe the legal requirement for fitting electrical enhancements.									
LO2: Tools And Equipment Used In Motor vehicle Electrical System Enhancement											
	2.1	List and identify types of tools and equipment used.									
	2.2	Describe the enhancement tools and equipment.									
	2.3	Carryout the preparation and testing of all the tools and equipment required, following manufacturers' instructions.									
	2.4	Use tools and equipment in line with manufacturer's specification.									
	2.5	Observe safety in storing and securing.									
LO3: Customer Needs And Requirements											
	3.1	Advise customer on the appropriate gas type (CNG or LPG?)									
	3.2	Assemble components which are compatible with the motor vehicle specification and customer requirements.									
	3.3	Monitor to ensure that all enhancements function to specification prior to release to the customer.									
	3.4	Implement all enhancement activities within the agreed timescale.									

	3.5	Communicate any anticipated delays in completion to the appropriate personnel promptly.									
LO4: Motor vehicle Electrical System Enhancements.											
	4.1	Observe safety and work ethics with suitable personal protective equipment and the use of motor vehicle coverings throughout all enhancement activities.									
	4.2	Carry out all electrical enhancement activities following: manufacturers' instructions your workplace procedures Health, Safety and Environment legal requirements									
	4.3	Adopt workshop rules and regulations to minimize the risk of: • damage to other motor vehicle systems • damage to other components and units • contact with leakages • contact with hazardous substances • damage to the environment									
	4.4	Use manufacturer's specification to adjust the components fitted and motor vehicle systems correctly for effective operation.									
	4.5	Inspect to ensure all enhancements function to specification prior to release to the customer									
	4.6	Carryout all enhancement activities within the agreed timescale									
	4.7	Communicate any anticipated delays in completion to the relevant authority promptly									

Learners Signature:	**Date:**
Assessors Signature:	Date:
IQA Signature (if sampled)	Date:
EQA Signature (if sampled)	**Date:**

UNIT 016: AUTOMOTIVE SERVICE TOOLS AND EQUIPMENT

Unit reference number: NADDC/GPV/L4/016
QCF level: 1
Credit value: 3
Guided learning hours: 30 HOURS

Unit Purpose:

This unit is about the basic use of tools, materials and fabrications relevant to the Automotive Sector and for those working in technical support roles. It is also appropriate for workshop planners.

This unit is about;

1. Interpreting information
2. Adopting safe and healthy working practices
3. Selecting materials and equipment
4. Service and maintenance of workshop tools and equipment
5. Storage of workshop tools and equipment

Unit assessment requirements/evidence requirements

Assessment must be carried out in real workplace environment in which automotive services and repair operations are carried out. Simulation is not allowed in this unit and level.

Assessment method will include:

- Direct Observation / oral questions (DO)
- Question and Answer (QA)
- Practical assessment
- Witness Testimony (WT)
- Personal statement (PS)
- Project
- Work product

UNIT 017: AUTOMOTIVE SERVICE TOOLS AND EQUIPMENT

LO (Learning outcome) Performance Criteria:-			Evidence Type					Evidence Ref Page number			
LO1: Common Automotive service hand and power tools	1.1	Identify basic tools and equipment in the automotive workshop									
	1.2	Carryout operation using hand and power tools in accordance with safe working practices to achieve the work outcome.									
	1.3	Use and maintain; ❖ Hand tools ❖ Ancillary equipment ❖ Safety aids.									
	1.4	Demonstrate work skills to select correct tools and equipment fabrication									
	1.5	Select relevant tools for the									
		following operations: ❖ Measure, ❖ mark out, ❖ file, ❖ fit, ❖ tap, ❖ thread, ❖ cut, ❖ drill, and secure work piece and tools.									
LO2: Common Automotive service workshop equipment											
	2.1	Explain the functions of the following workshop tools and equipment: ❖ 4/2 –post lift ❖ Wheel balancing/Alignment machines ❖ Brake testing machine, etc									

	2.2	Carry out pre-start preparation inspections on power tools and equipment in accordance with approved procedures									
	2.3	Store and secure workshop tools and equipment in line with workplace procedures									
LO3: Maintenance and servicing of workplace tools and equipment											
	3.1	Identify damaged and worn out tools and equipment									
	3.2	Service, adjust and or maintain tools and equipment as specified by manufacturer's/ and or workshop within the scope of responsibility.									
	3.3	Identify problems associated with power tools and equipment which need to be referred to authorized personnel									
	3.4	Carryout routine maintenance of automotive service tools and equipment in line with workplace procedures									
	3.5	Carry out checks in accordance with manufacturer's guidance,									
		regulatory bodies and organizational procedures.									
LO4: Workshop Tools And Equipment Storage											
	4.1	Explain different techniques used in automotive workshop tools and equipment storage									
	4.2	Explain different store documentation procedures in an automotive workshop									
	4.3	Store and secure workshop tools and equipment in line with workplace procedures.									
	4.4	Dispose waste generated as a result of tool/equipment									

		usage in accordance with workplace procedures.									

Learners Signature: Assessors Signature: IQA Signature (if sampled)	**Date:** Date: Date:
EQA Signature (if sampled)	**Date:**