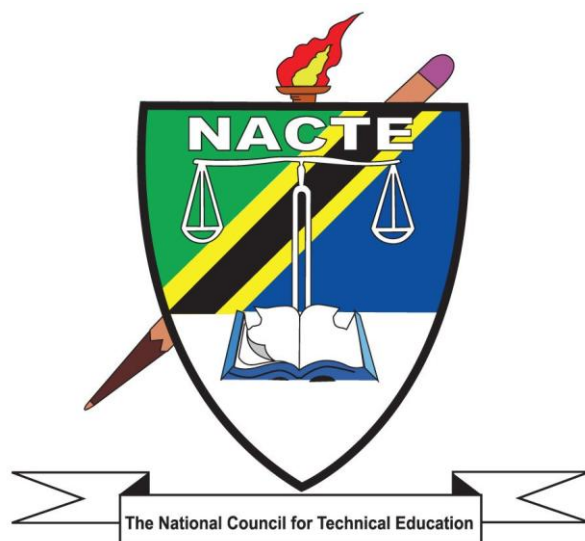


NATIONAL COUNCIL FOR TECHNICAL EDUCATION



NOVEMBER 2022

PROPOSED OCCUPATIONAL STANDARDS

OCCUPATION: AUTOMOTIVE ENGINEERS

LEVEL: NTA 4

TABLE OF CONTENT

Contents

TABLE OF CONTENT	ii
FOREWORD	iii
ACKNOWLEDGEMENT	v
ABBREVIATIONS	viii
GLOSSARY OF TERMS	ix
1.0. INTRODUCTION	1
2.0. OCCUPATIONAL STANDARD DEVELOPMENT PROCESS	2
3.0. THE SCOPE AND OVERVIEW OF THE OCCUPATION STANDARDS FOR AUTOMOTIVE ENGINEERS	3
4.0. VALIDITY PERIOD	4
5.0. OCCUPATIONAL STANDARDS	5
5.1 OCCUPATIONAL STANDARDS FOR AUTOMOTIVE ENGINEERS – NTA 4.....	5
TABLE 1: DACUM CHARTS FOR AUTOMOTIVE ENGINEERS NTA LEVEL 4.....	58

FOREWORD

The National Council for Technical Education (NACTE) is a corporate body established by the National Council for Technical Education Act, Cap.129. The Act provides a legal framework for the Council to coordinate the provision of technical education and training in Tanzania. The mandate of NACTE is three-fold, namely; Regulatory, Quality Assurance and Policy Advisory.

In discharging its mandate, the Council has been charged with the responsibilities, among others, to:

- (a) assist technical institutions in the transmission of knowledge, principles and training in the field of technical education and training for the benefit of the people of Tanzania;
- (b) assist technical institutions in the overall development of the quality of education they provide and to promote and to maintain approved academic standards;
- (c) establish and make awards in technical education which are consistent in standard and comparable to related awards in Tanzania and internationally; and
- (d) ensure that the quality of education required for the awards is met and maintained throughout the duration of the delivery of the course.

In the course of execution of these responsibilities, the Council has been instituting various measures aiming at advancing the quality of training provided in technical institutions in respect of the changing demands of the labour market, both local and international.

To achieve the above obligation, NACTE, under the Ministry of Education, Science and Technology implemented the East Africa skills for Transformation and Regional Integration Project (EASTRIP), a project aiming at promoting regional integration through supporting the regional corridors and sector markets, developing common standards and qualifications, and promoting mobility of students, faculty, and graduates. The project supports the Government of Tanzania to address shortage of skills in five sectors namely:

- (a) Energy;
- (b) Construction;
- (c) Information and Communication Technology (ICT);
- (d) Transportation; and
- (e) Agribusiness.

To address the skills, miss-match and shortage in the five (5) sectors in the country, the project funded, among others, a component of Development of Occupational Standards for Technical and Vocational Education and Training (TVET). In this regard, NACTE endeavoured to identify qualified and highly experienced experts in the five sectors from both the industry and training institutions to carry out the development of Occupational Standards. The exercise was carried out at Morogoro Teachers College – Morogoro from 16th July to 10th August, 2021. The output of the exercise is Occupational Standards for 12 occupations. Occupational standards for Automotive Engineering Technicians are among the occupational standards for 12 occupations which have been developed.

Since Occupational Standards are statements of work performance reflecting the ability to successfully complete the functions required in an occupation, as well as the application of knowledge, skills, attitudes and understanding in an occupation, it is the Council's expectations that the developed standards will form a robust base for decision making and provide explicit guidance to policy makers, curriculum developers, educators, employers and other stakeholders in matters related to manpower planning as well as execution of Technical and Vocational Education and Training undertakings.

Prof. J. W. Kondoro

CHAIRMAN

Dar es Salaam

NOVEMBER 2022

ACKNOWLEDGEMENT

The National Council for Technical Education (NACTE) is charged with the mandate to be the Quality Assurance organ of the Government in matters related to Technical and Vocational Education and Training (TVET) and production of qualified manpower for both local and international labour markets. In order to realize this obligation, NACTE endeavours to institute policies, guidelines and standards and to set the quality benchmarks for training institutions.

However, this is only possible if there is a strong base, linking the training institutions on one hand and the demands of the industry/labour market for relevant manpower on the other hand. Therefore, the Council undertook a step to develop Occupational Standards in sectors considered to be the engine to steer the country's desire to achieve an industrial economy. This exercise would not be a success without the input and support from our stakeholders. I am indebted to acknowledge some of them here.

I wish to acknowledge and appreciate the support from the Ministry of Education, Science and Technology through the East Africa skills for Transformation and Regional Integration Project (EASTRIP) for the financial support which facilitated the preparation of this document. I wish also to appreciate Mrs Leah Lukindo and Eng. Dr. Simon Baregu and for the tireless efforts and commitment in facilitating and guiding the standards development process, Ms. Eileen Tzamburakis, Ms. Chausiku Yakweli Ibrahim and Ms. Nuru Shirima for compiling and type setting the final document; and the NACTE Secretariat for coordinating the whole activity.

In a very special way, I wish further to extend my sincere gratitude to this team of wonderful experts who tirelessly dedicated their time and availed their invaluable intellect in the preparation of this document. I would like to recognise the colossal inputs of the following experts:

S/N	Name	Designation	Organization
1	Eng. David S. Mtunguja	Senior Instructor	Arusha Technical College (ATC)
2	Eng. Stembridge Lushatila	Regional Manager	Tanzania Electrical, Mechanical and Service Agencies (TEMESA) –

In addition, NACTE wishes to further enhance the internationalization of occupational standards and promote the modernization and internationalization of industries, thereby facilitating Tanzania's integration into the international market and expanding its development potential. Therefore, NACTE has invited China-Africa Vocational Education Alliance and China-Africa (Chongqing) Vocational Education Alliance to participate in the development, revision and review of occupational standards documents in collaboration with Chinese vocational institutions, so as to make use of their rich experience in vocational education efforts and rely on China's advanced and complete industrial chain and position in the international market to contribute to the development of vocational education and related industries in Tanzania.

Therefore, I would like to express my sincere gratitude to this specialized team of many Chinese institutions and experts. I thank them for their hard work and dedication, and for contributing their wisdom and experience to the preparation of this document. I would like to thank the following institutions and experts for their support:

S/N	Institute	Name	Title/area of expertise
1	Shaanxi Institute of Technology	Meng Fanzeng	Professor/Education and Teaching Reform
2		Zhao Xi	Associate Professor/CNC Machining Technology
3		Xu Hangjun	Associate Professor/Electronic Information Technology
4		Quan Chunfeng	Associate Professor/Automotive Inspection and Maintenance Technology
5		Sun Huan	Lecturer/Automotive Inspection and Maintenance Technology
6		Guo Jie	Lecturer/Automotive Inspection and Maintenance Technology

7		Yang Meng	Associate Professor/Automotive Inspection and Maintenance Technology
8		Liu Dan	Lecturer/Automotive Manufacturing and Testing Technology
9		Chen Yugang	Associate Professor/Automotive Manufacturing and Testing Technology
10		Song Weiping	Lecturer/Automotive Manufacturing and Testing Technology
11		Xin Tailong	Lecturer/Automotive Manufacturing and Testing Technology

Finally, I would like to thank all stakeholders in the project approval process for their strong support and for their expert insight and input regarding the validity of the content and the preparation of this document for the general public.

Dr. A. B. Rutayuga

EXECUTIVE SECRETARY

Dar es Salaam

NOVEMBER 2022

ABBREVIATIONS

ABS	-	Anti -Lock Braking System
ATF	-	Automatic Transmission Fluid
CAD	-	Computer Aided Design
CBET	-	Competence Based Education and Training
ICT	-	Information Computer Technology
IGT	-	Ignition Timing
IGF	-	Ignition Confirmation
MOPP	-	Maintenance Operating Policy and Procedure
NACTE	-	National Council for Technical Education
NOS	-	National Occupational Standards
OS	-	Occupational Standards
PLC	-	Programmable Logic Controller
PPE	-	Personal Protective Equipment
RPM	-	Revolutions Per Minute
TET	-	Technical Education and Training
TVET	-	Technical and Vocational Education and Training

GLOSSARY OF TERMS

Circumstantial Knowledge:	Detailed knowledge, which allows the decision-making in regard to different circumstances and cross cutting issues.
Competence:	The ability to use knowledge, understanding, practical and thinking skills to perform effectively to the workplace standards required in employment.
Competency:	A description of the ability one possesses when able to perform a given occupational task effectively and efficiently.
Competency-Based Education:	An instructional program that derives its content from validated tasks and bases assessment on the learner's performance.
Curriculum:	A description or composite of statements about “what is to be learned” by the trainee/student in a particular instructional programme; a product that states the “intended learning outcomes”.
Educational/Training Programme:	The complete curriculum and instruction (what and how) that is designed to prepare a person for employment in a job or other particular performance situation.
Occupation:	A specific position requiring the performance of specific tasks – essentially the same tasks are performed by all employees having the same title. (Example: baker)
Occupational Analysis:	A process used to identify the tasks that are important to employees in any given occupation.
Occupational Area:	This is a broad grouping of related jobs. Example: food service.
Occupational Competence:	The application of knowledge and skills to perform consistently to the standards required in the work context.
Occupational Standards:	Specific requirements of competences people are expected to demonstrate in a particular occupational area, including knowledge and relevant attitudes. They also act as performance tool of assessment of the pre – scribed

outcomes.

Performance Criteria:	Indicate the expected end results or outcome in form of evaluative statements.
Skills:	The ability to perform occupational tasks with a high degree of proficiency within a given occupation. Skill is conceived of as a composite of three completely interdependent components: cognitive, affective, and psychomotor.
Standards:	It is a set of statement, which if proved true under working conditions, means that an individual is meeting an expected level and type of performance.
Task Analysis:	The process of analysing each task to determine the steps, related knowledge, attitudes, performance standards, tools and materials needed, and safety concerns required of employees performing it.
Tasks:	A work activity that has a definite beginning and ending, is observable or measurable, consists of two or more definite steps, and leads to a product, service, or decision.
Underpinning Knowledge:	This is crucial knowledge that an individual must acquire in order to demonstrate competences that are associated in performing a given task.
Verification Process:	The process of having experts review and conform the importance of the task (competency) statements identified through occupational analysis. Other questions, such as the degree of task learning difficulty are also frequently asked. This process is also sometimes referred to as validation.

1.0. INTRODUCTION

Technical Education and Training (TET) is one of the most important education sub-sectors in Tanzania, responsible for developing a skilled workforce to support the country's industrialization economic agenda. Tanzania's Development Vision 2025 intends to raise the country's economy to a middle-income status. This requires a skilled workforce that is aligned with the needs of the public and private sectors of the economy. The National Council for Technical Education has begun the job of drafting Occupational Standards that will eventually be adopted as National Occupational Standards for TET in order to ensure that it meets the needs of the labour market and the country's economic agenda.

National Occupational Standards (NOS) are performance criteria that are matched with labour market demands. Each National Occupation Standard describes functions, performance standards, and knowledge/understanding for one important function or task. They combine skills, knowledge, and attitudes to describe best practice. They are useful tools for establishing job roles, personnel recruiting, supervision, and appraisal, as well as TET standards. They're also helpful for benchmarking and harmonizing qualifications on a national and international level. Standards, in general, provide a solid framework for high-quality TET that is labour market-relevant, current and consistent in delivery across all public and private institutions.

However, it must be noted that, Occupational Standards and Training standards/qualifications standards are different. Occupational standards are defined in terms of activities performed by a person in a selected occupation (e.g., an electrical engineer designs electrical wiring circuits, performs trouble shooting in electrical wiring, etc.) and they are usually defined by employers following procedures agreed upon by all stakeholders. Education and training standards are developed from the activities defined in occupational standards, and they include learning objectives to ensure that the necessary skills and knowledge are developed in a person to enable him or her to function at an agreed level in an occupation. Education and Training standards are used to define curricula in training institutions. It is however critical that there must be a direct link between the occupational standards and the training standards to respond to demands of the labour market.

In TET delivery, Tanzania adopted the Competency-based Education and Training (CBET) approach. The CBET approach focuses on providing learners with the skills and knowledge required to meet the occupational standards. Occupational standards are thus the starting

point for developing Competency-based Education and Training (CBET) programs. TET institutions will be required to benchmark their curricula with relevant occupational standards.

Occupational Standards are developed based on a given occupation's current and future demands. As a result, they serve as a means of bridging the gap between the worlds of employment and technical education and training (TET).

The Automotive Engineering Technician Occupation has its own set of occupational standards. The document explains how the occupational standards were developed, as well as the scope, the occupational profile in the form of DACUM charts, and the Occupational Standards.

2.0. OCCUPATIONAL STANDARD DEVELOPMENT PROCESS

The Occupational standards development process began with an examination of major documents that guide Tanzanian skill development. The 10-year National skills Development Strategy (2016-2026) was one of the documents reviewed, and it outlined six (6) economic sectors that should be prioritized when developing skills development programmes. These sectors include: Transport and logistics, Tourism and Hospitality, Agribusiness, Construction, Energy and ICT. NACTE labour market reports were also used in the literature review to determine the skills demand in the Tanzanian labour market as a whole.

After the literature review, a workshop comprised of expert workers and educators with substantial knowledge and experience in the occupation conducted an occupational analysis utilizing the DACUM approach to produce the occupational profile. The analysis resulted in DACUM Charts, which are attached as **Appendix 1** to this document.

The occupational standards were then developed. Experts in Occupational Analysis and Occupational Standards development facilitated the workshop. Interviews, online surveys, and a stakeholder forum were used to validate the occupational standards. Engineers, supervisory technicians on the job, and experienced Automotive Engineering technicians were key informants in the survey to discover occupational trends. This information was used to gain insight from the workplaces regarding trends and changes in the profession, including how well graduates are prepared for working in the occupation. A total of online surveys were completed by experts from the labour market across the country. Apart from the survey aiding in defining the scope for the occupational analysis, they served to engage a

wide cross-section of experts in the occupation. The stakeholders' forum was attended by participants from different parts of the country representing various companies.

3.0. THE SCOPE AND OVERVIEW OF THE OCCUPATION STANDARDS FOR AUTOMOTIVE ENGINEERING TECHNICIANS

These standards cover a broad range of duties and tasks that can be performed by an Automotive Engineering Technician. However, the occupational standards are not meant to replace individual job descriptions, they are to be used for guidance in defining skill levels and knowledge for the technician in specific settings or positions. The Automotive Engineering Technician may perform tasks in a number of key areas of the occupational standards, but not necessarily in all areas. For example, in large operations other individuals may be employed or designated to perform specific tasks.

Automotive Technicians work under minimal supervision of an engineer to inspect, repair, and maintain automobiles and other gasoline, diesel, or alternate-fuelled vehicles. In smaller shops, Technicians complete a wide variety of repairs from simple engine tune-ups to tearing down, repairing, and rebuilding of complete power systems and Body repair. Generally, the Automotive Engineering Technician performs the following duties:

- a) Perform Vehicle General Service
- b) Maintain Petrol and Diesel Engines
- c) Maintain Engine Tune Up
- d) Maintain Transmission System
- e) Perform Vehicle Diagnosis
- f) Maintain Hybrid Vehicles
- g) Maintain Brake System
- h) Maintain Suspension System
- i) Maintain Steering System
- j) Maintain Starting System
- k) Maintain Charging Systems
- l) Maintain Ignition System
- m) Maintain Lighting System
- n) Maintain Automotive Air Conditioning System

- o) Maintain Vehicle Body
- p) Maintain Vehicle Safety, Security and Entertainment Systems

The Occupational standards have been clustered into NTA qualification levels i.e., NTA level 4, 5 and 6.

4.0. VALIDITY PERIOD

The occupational standards will be valid for 3-5 years due to the fast-changing nature of technology. The review will proceed in the same manner as the previous one, with new occupational standards being developed based on current labour market information.

5.0. OCCUPATIONAL STANDARDS

5.1. OCCUPATIONAL STANDARDS FOR AUTOMOTIVE ENGINEERING TECHNICIAN – NTA 4

OCCUPATION	AUTOMOTIVE ENGINEER	OCCUPATION CODE	
DUTY TITLE	PERFORM VEHICLE GENERAL SERVICE	DUTY NO.	401
TASK TITLE	CONDUCT UNDER HOOD INSPECTION	TASK NO.	4011
PERFORMANCE CRITERIA	The person performing this task must be able to conduct under hood inspection as per Vehicle Service Manual, Society of Automobile Engineering, Road safety regulations and technical requirements.		
RANGE STATEMENT	This unit can be performed in the automotive workshop under supervision of a senior Technician or Automotive Engineer. The following tools and equipment will be needed in performing this task: 1. Vehicle; 2. Auto-data; 3. Inspection lamps; 4. Vehicle Manuals books; 5. Full set of automotive tool box.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Select the working tools for the task; 2. Inspect Fan belts; 3. Inspect battery terminals; 4. Inspect water hoses; 5. Inspect reservoirs; 6. Inspect Wiring harnesses; 7. Inspect leaks; 8. Inspect lights; 9. Observe safety regulations when performing the task 10. Clean workplace; 11. Store tools and equipment.		Detailed knowledge about: 1.0. Methods: The person performing this task must be able to explain how to: 1.1. Inspect vehicle battery cracks; 1.2. Inspect battery terminal; 1.3. Inspect water hoses; 1.4. Inspect fan belt; 1.5. Inspect Lightings; 1.6. Inspect accessories. 2.0. Principles: The person must be able to explain the principles of conducting vehicle inspection. 3.0. Theories: The person must be able to explain: 3.1. Vehicle Inspection procedures; 3.2. Preventive maintenance schedules; 3.3. Use of right tools and equipment. 4.0. Essential skills: 4.1. Communication skills; 4.2. Computer skills; 4.3. Customer care skills; 4.4. Team work skills; 4.5. Report writing skills.	

DESCRIPTION OF END PRODUCTS/SERVICE	The vehicle is inspected under hood as per Vehicle Service Manual.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Safe handling of working tools; 2. Safe handling of measuring instruments; 3. Occupational health and safety; 4. Maintenance operating policy and procedure (MOPP); 5. Waste disposal methods.

OCCUPATION	AUTOMOTIVE ENGINEER	OCCUPATION CODE	
DUTY TITLE	PERFORM VEHICLE GENERAL SERVICE	DUTY NO.	401
TASK TITLE	CONDUCT VEHICLE WALK AROUND INSPECTION	TASK NO.	4012
PERFORMANCE CRITERIA	A person performing this task must be able to conduct vehicle walk around inspection as per technical requirements.		
RANGE STATEMENT	This task can be performed in the automotive workshop under the Supervision of a senior Technician or Automotive Engineer, Tools and Equipment to be available are: 1. PPE such as Safety Shoes, Glasses, Gloves; 2. Tread gauge; 3. Pressure Gauge.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Select the right inspection tools for the task; 2. Inspect tyre pressure; 3. Inspect Tread depth; 4. Inspect windscreen glass; 5. Inspect Side Mirrors; 6. Record defects if any; 7. Clean workplace; 8. Store tools and equipment.		Detailed knowledge about: 1.0 Methods: This person performing this task must be able to explain how to conduct the walk around inspection. 2.0 Principles: 2.1 The person must be able to explain the principles of: Vehicle safety and inspections procedure; 2.2 Safety and environmental protection. 3.0 Theories: The person must be able to explain: 3.1 Vehicle inspection and repair; 3.2 Use of right tools and equipment. 4.0. Essential skills: 4.1. Communication skills; 4.2. Customer care skills; 4.3. Team work skills; 4.4. Report writing skills.	
DESCRIPTION OF END PRODUCTS/SERVICE		Walk around inspection is done as per technical requirements.	
CIRCUMSTANTIAL KNOWLEDGE		Detailed knowledge about: 1. Safe handling of working tools; 2. Safe handling of measuring instruments; 3. Occupational health and safety; 4. Maintenance operating policy and procedure (MOPP); 5. Waste disposal methods.	

OCCUPATION	AUTOMOTIVE ENGINEER	OCCUPATION CODE	
DUTY TITLE	PERFORM VEHICLE GENERAL SERVICE	DUTY NO.	401
TASK TITLE	PERFORM ENGINE SERVICE	TASK NO.	4013
PERFORMANCE CRITERIA	The person performing this task must be able to perform engine service as per technical requirements and manufacturer Service Manual.		
RANGE STATEMENT	This task can be performed in the automotive workshop under the Supervision of Full Technician or Automotive Engineer, The following tools and equipment will be required: 1. Full set of Automotive tool box; 2. Oil drain kit; 3. Jacks; 4. Special tools for filters; 5. Pressure washing machine; 6. Air compressor; 7. Funnel Diagnostic equipment; 8. Power source; 9. Pitch/ramp/lifter; 10. P.P.E, such as Safety Shoes; 11. Glasses; 12. Gloves; 13. Manufacturer’s Service Manual; 14. Battery booster Machine.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Observe health and safety rules when performing the task; 2. Select right tools for the task; 3. Check Engine oil level and conditions; 4. Drain engine oil; 5. Change oil filter; 6. Change fuel Filters; 7. Clean air cleaner; 8. Change Air cleaner; 9. Tighten drain plug; 10. Top up specified grade of Engine oil; 11. Keep records on the service; 12. Oil storage tank; 13. Cleaning tools and working place; 14. Store tools and equipment.		Detailed knowledge about: 1.0. Methods: The person performing this task must be able to explain how to: 1.1. Observe health and safety precautions; 1.2. Check Engine oil level and condition; 1.3. Drain the engine oil; 1.4. Change oil filter; 1.5. Change fuel filter; 1.6. Top up specified grade of oil; 1.7. Tighten Drain Plug; 1.8. Programme fuel injectors. 2.0. Principles: The person must be able to explain the principles of: 2.1. Performing engine general service; 2.2. Programming fuel injectors. 3.0. Theories: The person must be able to explain: 3.1. Engine components and their functions;	

	3.2. Engine oil types. 4.0. Essential skills: 4.1. Communication skills; 4.2. Customer care skills; 4.3. Team work skills; 4.4. Report writing skills; 4.5. Entrepreneurship skills.
DESCRIPTION OF END PRODUCTS/SERVICE	Engine is serviced as per Manufacturer's specifications and technical requirements.
CIRCUMSTANTIAL KNOWLEDGE:	Detailed knowledge about: 1. Safe handling of working tools; 2. Safe handling of measuring instruments; 3. Occupational health and safety; 4. Maintenance operating policy and procedure (MOPP); 5. Waste disposal methods.

OCCUPATION	AUTOMOTIVE ENGINEER	OCCUPATION CODE	
DUTY TITLE	PERFORM VEHICLE GENERAL SERVICE	DUTY NO.	401
TASK TITLE	PERFORM GEARBOX SERVICE	TASK NO.	4014
PERFORMANCE CRITERIA	A person performing this task must be able to perform Gearbox Service as per technical requirements and manufacturer Service Manual.		
RANGE STATEMENT	This task can be performed in the automotive workshop under the Supervision of a senior Technician or Automotive Engineer, The following tools and equipment will be required: 1. Full set of Automotive tool box; 2. Jacks; 3. Pitch/ramp/lifter; 4. Gearbox oil filling equipment; 5. Oil container.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Observe health and safety precautions when performing the task; 2. Select right tools for the task; 3. Check Gearbox oil level and condition; 4. Drain gearbox oil; 5. Top up specified grade of gearbox oil; 6. Tighten drain plug; 7. Keep record on the service conducted; 8. Clean the working place; 9. Equipment and tools; 10. Return tools and equipment to store.		Detailed knowledge about: 1.0. Methods: The person performing this task must be able to explain how to: 1.1. Check gearbox oil level and condition; 1.2. Drain gearbox oil; 1.3. Top up specified grade of gearbox oil; 1.4. Tighten Drain Plug. 2.0. Principles: The person must be able to explain the principles of: 2.1. Performing General service of Manual Gearbox; 2.2. Performing General service of Automatic Gearbox. 3.0. Theories: The person must be able to explain: 3.1. Transmission System components operations and services; 3.2. Use of right tools and equipment Importance of using proper oil. 4.0. Essential skills: 4.1. Communication skills; 4.2. Customer care skills; 4.3. Team work skills; 4.4. Report writing skills.	
DESCRIPTION OF END PRODUCTS/SERVICE		The gearbox is serviced as per technical requirements and manufacturer's specifications.	

CIRCUMSTANTIAL KNOWLEDGE:	Detailed knowledge about: 1. Safe handling of working tools; 2. Safe handling of measuring instruments; 3. Occupational health and safety; 4. Maintenance operating policy and procedure (MOPP); 5. Waste disposal methods.
--------------------------------------	--

OCCUPATION	AUTOMOTIVE ENGINEER	OCCUPATION CODE	
DUTY TITLE	PERFORM VEHICLE GENERAL SERVICE	DUTY NO.	401
TASK TITLE	PERFORM DIFFERENTIAL SERVICE	TASK NO.	4015
PERFORMANCE CRITERIA	A person performing this task must be able to perform differential service as per technical requirements and manufacturer Service Manual.		
RANGE STATEMENT	This task can be performed in the automotive workshop under the supervision of a senior Technician or Automotive Engineer, The following tools and equipment will be required: 1. Full set of Automotive tool box; 2. Jacks; 3. Pitch/ramp/lifter; 4. Differential oil filling equipment; 5. Oil container.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE	UNDERPINNING KNOWLEDGE		
The person performing this task must be able to do the following: 1. Observe health and safety precautions when performing the task; 2. Select right tools for the task; 3. Check differential oil level and condition; 4. Drain differential oil; 5. Top up specified grade of differential oil; 6. Tighten drain plug; 7. Keep record of service done; 8. Clean the tools, equipment and working place. 9. Return the tools and equipment to store.	Detailed knowledge about: 1.0. Methods: This person performing this task must be able to explain how to: 1.1. Check differential oil; 1.2. Drain the differential oil; 1.3. Top up specified grade of oil; 1.4. Tighten Drain Plug. 2.0. Principles: The person must be able to explain the principles of performing differential general service. 3.0. Theories: The person must be able to explain: 3.1. Differential system and components operations; 3.2. Use of right tools and equipment; 3.3. Differential locking devices. 4.0. Essential skills: 4.1. Communication skills; 4.2. Customer care skills; 4.3. Team work skills; 4.4. Report writing skills.		
DESCRIPTION OF END PRODUCTS/SERVICE	The differential is serviced as per technical requirements and manufacturer's specification.		

CIRCUMSTANTIAL KNOWLEDGE:	Detailed knowledge about: 1. Safe handling of working tools; 2. Safe handling of measuring instruments; 3. Occupational health and safety; 4. Maintenance operating policy and procedure (MOPP); 5. Waste disposal methods.
--------------------------------------	--

OCCUPATION	AUTOMOTIVE ENGINEER	OCCUPATION CODE	
DUTY TITLE	PERFORM VEHICLE GENERAL SERVICE	DUTY NO.	401
TASK TITLE	PERFORM GREASING	TASK NO.	4016
PERFORMANCE CRITERIA	A person performing this task must be able to perform greasing as per technical requirements and manufacturer service manual.		
RANGE STATEMENT	This task can be performed in the automotive workshop under the supervision of a senior Technician or Automotive Engineer, the following tools and equipment will be required: 1. Full set of Automotive tool box; 2. Jacks; 3. Pitch/ramp/lifter; 4. Grease pump; 5. Grease gun; 6. High pressure washing machine; 7. Air compressor; 8. Power source.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Observe health and safety precautions when performing the task; 2. Select right tools for the task; 3. Perform greasing on ball joist 4. Perform greasing on constant velocity (CV)joints; 5. Perform greasing on Steering joints; 6. Perform greasing on Propeller shaft cross joints; 7. Perform greasing on door and bonnet hinges; 8. Perform greasing on propeller shaft sliding joints; 9. Keep record on the greasing done; 10. Clean tools, equipment and working place; 11. Store tools and Equipment		Detailed knowledge about: 1.0. Methods: The person performing this task must be able to explain how to: 1.1. Select Perform greasing on ball joints; 1.2. Perform greasing on constant velocity (CV) joints; 1.3. Perform greasing on Steering joints; 1.4. Perform greasing on Propeller shaft cross joints; 1.5. Perform greasing on door and bonnet hinges; 1.6. Perform greasing on Propeller shaft sliding joints equipment. 2.0. Principles: The person must be able to explain the principles of applying grease on the Vehicle parts. 3.0. Theories: The person must be able to explain: 3.1. Greasing Vehicle components; 3.2. Use of right tools and equipment; 3.3. Importance of using proper type of Grease. 4.0. Essential skills: 4.1. Communication skills; 4.2. Customer care skills; 4.3. Team work skills; 4.4. Report writing skills.	

DESCRIPTION OF END PRODUCTS/SERVICE	The Greasing in a motor vehicle is performed as per technical requirements and manufacturer's specifications.
CIRCUMSTANTIAL KNOWLEDGE:	Detailed knowledge about: 1. Safe handling of working tools; 2. Safe handling of measuring instruments; 3. Occupational health and safety; 4. Maintenance operating policy and procedure (MOPP); 5. Waste disposal methods.

OCCUPATION	AUTOMOTIVE ENGINEER	OCCUPATION CODE	
DUTY TITLE	PERFORM VEHICLE GENERAL SERVICE	DUTY NO.	401
TASK TITLE	MAINTAIN HYDRAULIC SYSTEMS	TASK NO.	4017
PERFORMANCE CRITERIA	A person performing this task must be able to maintain hydraulic systems as per technical requirements and manufacturer service manual.		
RANGE STATEMENT	This task can be performed in the automotive workshop under the Supervision of a senior Technician or Automotive Engineer, the following tools and equipment will be required: 1. Full set of Automotive tool box; 2. Hydraulic Jacks; 3. Pitch/ramp/lifter; 4. Hydraulic container; 5. Vehicle with hydraulic operated systems.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Observe safety and health precautions when performing the task; 2. Select the right tools and equipment for the task; 3. Service hydraulic operated doors; 4. Service hydraulic operated lifts; 5. Service hydraulic Jacks plug; 6. Keep record on service performed; 7. Clean tools, equipment and working place; 8. Store tools and equipment		Detailed knowledge about: 1.0. Methods: The person performing this task must be able to explain how to: 1.1. Service hydraulic operated doors; 1.2. Service hydraulic operated lifts; 1.3. Service hydraulic Jacks plug. 2.0. Principles: The person must be able to explain the principles of servicing Hydraulic systems. 3.0. Theories: The person must be able to explain: 3.1. Hydraulic operated systems operation and services; 3.2. Use of right tools and equipment. 4.0. Essential skills: 4.1. Communication skills; 4.2. Customer care skills; 4.3. Team work skills; 4.4. Report writing skills.	
DESCRIPTION OF END PRODUCTS/SERVICE		Hydraulic systems of a motor vehicle are serviced as per manufacturer's manual and technical specifications.	

CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Safe handling of working tools; 2. Safe handling of measuring instruments; 3. Occupational health and safety; 4. Maintenance operating policy and procedure(MOPP); 5. Waste disposal methods.
-------------------------------------	---

OCCUPATION	AUTOMOTIVE ENGINEER	OCCUPATION CODE	
DUTY TITLE	MAINTAIN PETROL ENGINE	DUTY NO.	402
TASK TITLE	DISMOUNT PETROL ENGINE FROM THE VEHICLE	TASK NO.	4021
PERFORMANCE CRITERIA	A person performing this task must be able to dismount a petrol engine from the vehicle as per technical requirements and manufacturer Service Manual.		
RANGE STATEMENT	This task can be performed in the automotive workshop under the supervision of a senior Technician or Automotive Engineer. The following tools and equipment will be required: 1. Full set of automotive tool box; 2. Jacks; 3. Pitch/ramp/lifter; 4. Crane wagon.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Maintain Observe safety precautions when performing the task; 2. Select right tools for the task; 3. Disconnect cooling system; 4. Separate Wiring harnesses; 5. Separate Gearbox; 6. Drain the engine oil; 7. Remove the Engine from the vehicle body; 8. Clean tools, equipment and working place; 9. Store tools and equipment; 10. Empty coolant.		Detailed knowledge about: 1.0. Methods: The person performing this task must be able to explain how to: 1.1. Select right tools for the task; 1.2. Disconnect cooling system; 1.3. Disconnect Wiring harnesses; 1.4. Disconnect Gearbox; 1.5. Drain the engine oil; 1.6. Remove the Engine from the vehicle body; 1.7. Empty coolant. 2.0. Principles: The person must be able to explain the principles of dismantling the Engine from the Vehicle body. 3.0. Theories: The person must be able to explain: 3.1. Engine system and components operations; 3.2. Use of right tools and equipment. 4.0. Essential skills: 4.1. Communication skills; 4.2. Customer care skills; 4.3. Team work skills; 4.4. Report writing skills.	
DESCRIPTION OF END PRODUCTS/SERVICE		The engine is dismounted from the vehicle body as per technical requirements.	

CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Safe handling of working tools; 2. Safe handling of measuring instruments; 3. Occupational health and safety; 4. Maintenance operating policy and procedure (MOPP); 5. Waste disposal methods.
-------------------------------------	--

OCCUPATION	AUTOMOTIVE ENGINEER	OCCUPATION CODE	
DUTY TITLE	MAINTAIN PETROL ENGINE	DUTY NO.	402
TASK TITLE	OVERHAUL PETROL ENGINE OVERHAUL	TASK NO.	4022
PERFORMANCE CRITERIA	A person performing this task must be able to overhaul petrol engine as per technical requirements and manufacturer Service Manual		
RANGE STATEMENT	This task can be performed in the automotive workshop e under the supervision of a senior Technician or Automotive/Mechanical Engineer. The following tools and equipment will be required: 1. Full set of automotive tool box; 2. Oil Cane; 3. Jacks; 4. Pitch/ramp/lifter; 5. Crane wagon.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Observe safety and Health when performing the task; 2. Select right tools for the task; 3. Disassemble the Engine; 4. Clean engine parts; 5. Inspect the parts; 6. Measure the crankshafts; 7. Measure the Cylinder block; 8. Measure the cylinder head; 9. Identify the worn-out parts; 10. Replace worn out parts; 11. Assemble the Engine; 12. Test the engine; 13. Cleaning tools, equipment and the working place; 14. Store tools and equipment.		Detailed knowledge about: 1.0. Methods: The person performing this task must be able to explain how to: 1.1. Disassemble Engine; 1.2. Inspect the parts; 1.3. Measure the crankshafts; 1.4. Measure the Cylinder block; 1.5. Assemble the Engine; 1.6. Test engine. 2.0. Principles: The person must be able to explain the principles of overhauling an engine. 3.0. Theories: The person must be able to explain: 3.1. Engine system and components operations; 3.2. Use of right tools and equipment. 4.0. Essential skills: 4.1. Communication skills; 4.2. Customer care skills; 4.3. Team work skills; 4.4. Report writing skills.	
DESCRIPTION OF END PRODUCTS/SERVICE		1. Overhaul of the engine is performed as per approved standards and procedures;	

	2. Overhauled engine is functioning as per manufacturer's manual and technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Safe handling of working tools; 2. Safe handling of measuring instruments; 3. Occupational health and safety; 4. Maintenance operating policy and procedure (MOPP); 5. Waste disposal methods.

OCCUPATION	AUTOMOTIVE ENGINEER	OCCUPATION CODE	
DUTY TITLE	MAINTAIN PETROL ENGINE	DUTY NO.	402
TASK TITLE	REMOUNT PETROL ENGINE	TASK NO.	4023
PERFORMANCE CRITERIA	A person performing this task must be able to remount petrol engine as per technical requirements and manufacturer’s Service Manual		
RANGE STATEMENT	This task can be performed in the automotive workshop under the supervision of a senior Technician or Automotive/Mechanical Engineer. The following tools and equipment will be required: 1. Full set of automotive tool box; 2. Jacks; 3. Pitch/ramp/lifter; 4. Crane wagon.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Observe Safety and health precautions when performing the task; 2. Select proper tools and equipment; 3. Fit the Engine to the vehicle; 4. Fasten the engine to the chassis/body; 5. Connect all the linkages; 6. Adjust the Engine Leakages; 7. Programme the Engine; 8. Test the engine performance; 9. Clean tools, equipment and the working places; 10. Store tools and equipment; 11. Engine resupply.		Detailed knowledge about: 1.0. Methods: The person performing this task must be able to explain how to: 1.1. Fit the Engine to the vehicle; 1.2. Test the engine performance; 1.3. Programme the Engine. 2.0. Principles: The person must be able to explain the principles involved in maintaining a Petrol Engine. 3.0. Theories: The person must be able to explain: 3.1. Petrol Engine operations and maintenance; 3.2. Use of right tools and equipment. 4.0. Essential skills: 4.1. Communication skills; 4.2. Customer care skills; 4.3. Team work skills; 4.4. Report writing skills.	
DESCRIPTION OF END PRODUCTS/SERVICE		The engine is mounted to the vehicle body as per manufacturer’s specifications and technical requirements.	
CIRCUMSTANTIAL KNOWLEDGE		Detailed knowledge about: 1. Safe handling of working tools; 2. Safe handling of measuring instruments; 3. Occupational health and safety; 4. Maintenance operating policy and procedure (MOPP); 5. Waste disposal methods.	

OCCUPATION	AUTOMOTIVE ENGINEER	OCCUPATION CODE	
DUTY TITLE	MAINTAIN DIESEL ENGINE	DUTY NO.	403
TASK TITLE	DISMOUNT DIESEL ENGINE	TASK NO.	4031
PERFORMANCE CRITERIA	A person performing this task must be able to dismount Diesel Engine as per technical requirements and manufacturer Service Manual		
RANGE STATEMENT	This task can be performed in the automotive workshop under the supervision of a senior Technician or Automotive/Mechanical Engineer. The following tools and equipment will be required 1. Full set of tool box; 2. Jacks; 3. Pitch/ramp/lifter; 4. Crane wagon.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Observe safety precautions when performing the task; 2. Select right tools for the task; 3. Separate cooling system; 4. Disconnect Wiring harnesses; 5. Separate Gearbox; 6. Drain the engine oil; 7. Loosen all bolts holding the engine to chassis/body; 8. Remove the Engine from the vehicle body; 9. Clean tools, equipment and working place; 10. Store tools and equipment; 11. Empty coolant.		Detailed knowledge about: 1.0. Methods: The person performing this task must be able to explain how to: 1.1. Disconnect cooling system; 1.2. Disconnect Wiring harnesses; 1.3. Separate gearbox; 1.4. Drain the engine oil; 1.5. Remove the Engine from the vehicle body. 2.0. Principles: The person must be able to explain the principles of dismantling the Engine from the Vehicle body. 3.0. Theories: The person must be able to explain: 3.1. Engine system and components operations; 3.2. Use of right tools and equipment; 3.3. Dismounting the engine from the vehicle. 4.0. Essential skills: 4.1. Communication skills; 4.2. Customer care skills; 4.3. Team work skills; 4.4. Report writing skills.	
DESCRIPTION OF END PRODUCTS/SERVICE		Engine is dismounted from the vehicle body as per technical requirements.	
CIRCUMSTANTIAL KNOWLEDGE		Detailed knowledge about: 1. Safe handling of working tools; 2. Safe handling of measuring instruments;	

	3. Occupational health and safety; 4. Maintenance operating policy and procedure (MOPP); 5. Waste disposal method.
--	--

OCCUPATION	AUTOMOTIVE ENGINEER	OCCUPATI ON CODE	
DUTY TITLE	MAINTAIN DIESEL ENGINE	DUTY NO.	403
TASK TITLE	OVERHAUL DIESEL ENGINE	TASK NO.	4032
PERFORMAN CE CRITERIA	A person performing this task must be able to overhaul diesel engine as per technical requirements and manufacturer Service manual		
RANGE STATEMENT	This task can be performed in the automotive workshop under the Supervision of a senior Technician or Automotive/Mechanical Engineer. The following tools and equipment will be required: 1. Full set of automotive tool box; 2. Jacks; 3. Pitch/ramp/lifter; 4. Crane wagon; 5. Diagnosis Machine; 6. P.P.E. such as Safety Shoes, Glasses, Gloves.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Observe safety and Health precautions when performing the task; 2. Disassemble the Engine; 3. Clean engine parts; 4. Inspect parts; 5. Measure crankshafts; 6. Measure Cylinder block; 7. Service cylinder head; 8. Identify worn out parts; 9. Replace worn out parts; 10. Assemble the Engine; 11. Perform Injection timing; 12. Program Injector nozzles; 13. Test the engine; 14. Clean tools, equipment and the working place; 15. Store tools and equipment.		Detailed knowledge about: 1.0. Methods: The person performing this task must be able to explain how to: 1.1. Disassemble the Engine; 1.2. Measure the crankshafts; 1.3. Measure the Cylinder block; 1.4. Measure the cylinder head; 1.5. Identify the worn-out parts; 1.6. Assemble the Engine. 2.0. Principles: The person must be able to explain the principles of overhauling a diesel engine. 3.0. Theories: The person must be able to explain: 3.1. Diesel Engine system and components operations; 3.2. Use of right tools and equipment; 3.3. Importance of Diesel Engine overhaul. 4.0. Essential skills: 4.1. Communication skills; 4.2. Customer care skills; 4.3. Team work skills; 4.4. Report writing skills.	
DESCRIPTION OF END PRODUCTS/SERVICE		1. Overhaul of diesel engine is performed as per approved procedures.	

	2. Overhauled Diesel Engine functions as per manufacturer's manual and technical requirements.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Safe handling of working tools; 2. Safe handling of measuring instruments; 3. Occupational health and safety; 4. Maintenance operating policy and procedure (MOPP); 5. Waste disposal methods.

OCCUPATION	AUTOMOTIVE ENGINEER	OCCUPATION CODE	
DUTY TITLE	MAINTAIN DIESEL ENGINE	DUTY NO.	403
TASK TITLE	REMOUNT DIESEL ENGINE	TASK NO.	4033
PERFORMANCE CRITERIA	A person performing this task must be able to remount the diesel engine as per technical requirements and manufacturer Service Manual.		
RANGE STATEMENT	This task can be performed in the automotive workshop under the supervision of a senior Technician or Automotive/Mechanical Engineer. The following tools and equipment will be required: 1. Full set of Automotive tool box; 2. Jacks; 3. Pitch/ramp/lifter; 4. Crane wagon.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Observe Safety and health precautions when performing the task; 2. Select proper tools and equipment; 3. Fit the Engine to the vehicle; 4. Fasten the engine to the chassis/body; 5. Connect all the linkages; 6. Adjust the Engine Leakages; 7. Test the engine performance; 8. Programme the Engine; 9. Clean tools, equipment and the working places; 10. Store tools and equipment; 11. Engine resupply.		Detailed knowledge about: 1.0. Methods: The person performing this task must be able to explain how to: 1.1. Fit the Engine to the vehicle; 1.2. Programme the Engine; 1.3. Test the engine performance. 2.0. Principles: The person must be able to explain the principles involved when performing Diesel Engine Maintenance. 3.0. Theories: The person must be able to explain: 3.1. Diesel Engine theory; 3.2. Injector Nozzle programming; 3.3. Use of right tools and equipment. 4.0. Essential skills: 4.1. Communication skills; 4.2. Customer care skills; 4.3. Team work skills; 4.4. Report writing skills.	
DESCRIPTION OF END PRODUCTS/SERVICE		Diesel Engine is mounted to the vehicle body as per Manufacturer's Specifications and technical requirements	
CIRCUMSTANTIAL KNOWLEDGE		Detailed knowledge about: 1. Safe handling of working tools; 2. Safe handling of measuring instruments; 3. Occupational health and safety.	

	4. Maintenance operating policy and procedure (MOPP); 5. Waste disposal methods.
--	--

OCCUPATION	AUTOMOTIVE ENGINEER	OCCUPATION CODE	
DUTY TITLE	MAINTAIN ENGINE TUNE UP	DUTY NO.	404
TASK TITLE	ADJUST ENGINE SYSTEMS	TASK NO.	4041
PERFORMANCE CRITERIA	A person performing this task must be able to adjust engine systems as per technical requirements and manufacturer ‘s service manual		
RANGE STATEMENT	This Task can be performed in the automotive workshop under the supervision of a senior Technician or Automotive/Mechanical Engineer The following tools and equipment will be required: 1. Full set of Automotive tool box; 2. Exhaust gas analyser Machine; 3. Pitch/ramp/lifter; 4. Air Compressor; 5. Timing torch; 6. High pressure vehicle washing machine; 7. Power source; 8. Diagnosis Machines; 9. P.P.E, such as Safety Shoes, Glasses, Gloves; 10. Mustimeter; 11. Clamp meter; 12. Test lamp; 13. Air compressor; 14. Stethoscope; 15. Compression Testers; 16. Vacuum gauges; 17. Pressure gauges; 18. Vehicles.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Observe health and safety precautions when performing the task; 2. Select the required tools and equipment for performing the task; 3. Check Engine RPM; 4. Adjust Engine RPM; 5. Check engine running Temperature; 6. Check Oil pressure; 7. Check Exhaust gases; 8. Listen the engine sound; 9. Observe leaks; 10. Adjust engine timing; 11. Clean tools and equipment;		Detailed knowledge about: 1.0. Methods: The person performing this task must be able to explain how to: 1.1. Check Engine RPM; 1.2. Adjust Engine RPM; 1.3. Check engine running Temperature; 1.4. Check Oil pressure; 1.5. Adjust engine timing. 2.0. Principles: The person must be able to explain the principles involved in performing engine tune up. 3.0. Theories: The person must be able to explain: 3.1. Normal running conditions of Both petrol and Diesel Engines;	

12. Clean work place; 13. Store tools and equipment appropriately.	3.2. The use of proper tools and equipment. 4.0. Essential skills: 4.1. Communication skills; 4.2. Customer care skills; 4.3. Team work skills; 4.4. Report writing skills.
DESCRIPTION OF END PRODUCTS/SERVICE	Engine systems are adjusted as per technical specifications and manufacturer's manual.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Safe handling of working tools; 2. Safe handling of measuring instruments; 3. Maintenance operating policy and procedure (MOPP); 4. Waste disposal methods.

OCCUPATION	AUTOMOTIVE ENGINEER	OCCUPATION CODE	
DUTY TITLE	MAINTAIN ENGINE TUNE UP	DUTY NO.	404
TASK TITLE	REPAIR FUEL SYSTEM	TASK NO.	4042
PERFORMANCE CRITERIA	A person performing this task must be able to repair fuel systems as per technical requirements and manufacturer service manual.		
RANGE STATEMENT	This task can be performed in the automotive workshop under the Supervision of a senior Technician or Automotive/Mechanical Engineer The following tools and equipment will be required: 1. Full set of Automotive tool box; 2. Exhaust gas analyser Machine; 3. Pitch/ramp/lifter; 4. Air Compressor; 5. Timing torch ; 6. High pressure vehicle Washing machine; 7. Power source; 8. Diagnosis Machines; 9. P.P.E, such as Safety Shoes, Glasses, Gloves; 10. Multimeter; 11. Clamp meter; 12. Test lamp; 13. Air compressor; 14. Stethoscope; 15. Compression Testers; 16. Vacuum gauges; 17. Pressure gauges.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Observe health and Safety when performing the task; 2. Select right tools and equipment for the task; 3. Check fuel pump pressure; 4. Service Sender units; 5. Service receiver units; 6. Clean Fuel Tank; 7. Check Fuel pressure; 8. Adjust fuel flow; 9. Adjust Air flow; 10. Observe leaks; 11. Fix leaks; 12. Service common rail system; 13. Program injector nozzles; 14. Replace fuel filters; 15. Clamp fuel hoses.		Detailed knowledge about: 1.0. Methods: The person performing this task must be able to explain how to: 1.1. Check fuel pump pressure; 1.2. Service Sender units; 1.3. Service receiver units; 1.4. Adjust fuel flow; 1.5. Adjust Air flow; 1.6. Program injector nozzles. 2.0. Principles: The person must be able to explain the principles involved in performing engine tune up. 3.0. Theories: The person must be able to explain: 3.1. Normal running conditions of both Petrol and Diesel Engines;	

	3.2. Fuel system components and operations. 4.0. Essential skills: 4.1. Communication skills; 4.2. Customer care skills; 4.3. Team work skills; 4.4. Report writing skills.
DESCRIPTION OF END PRODUCTS/SERVICE	Automobile Fuel systems are repaired as per technical specifications and manufacturer's manual.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Safe handling of working tools; 2. Safe handling of measuring instruments; 3. Maintenance operating policy and procedure (MOPP); 4. Waste disposal methods.

OCCUPATION	AUTOMOTIVE ENGINEER	OCCUPATION CODE	
DUTY TITLE	MAINTAIN ENGINE TUNE UP	DUTY NO.	404
TASK TITLE	REPAIR IGNITION SYSTEM	TASK NO.	4043
PERFORMANCE CRITERIA	A person performing this task must be able to repair ignition systems as per technical requirements and manufacturer service manual		
RANGE STATEMENT	This task can be performed in the automotive workshop under the supervision of a senior Technician or Automotive/Mechanical Engineer. The following tools and equipment will be required: 1. Full set of Automotive tool box; 2. Exhaust gas analyser Machine; 3. Pitch/ramp/lifter; 4. Air Compressor; 5. Timing torch; 6. High pressure vehicle washing machine; 7. Power source; 8. Diagnosis Machines; 9. P.P.E, such as Safety Shoes, Glasses, Gloves; 10. Multimeter; 11. Clamp meter; 12. Test lamp; 13. Air compressor; 14. Stethoscope; 15. Compression Testers; 16. Vacuum gauges; 17. Pressure gauges.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Observe health and Safety when performing the task; 2. Select right tools and equipment for the task; 3. Check ignition connectors; 4. Tighten ignition connectors; 5. Adjust the distributor; 6. Tighten the distributor; 7. Check High Tension leads; 8. Check Ignition Timing; 9. Clean tools and equipment; 10. Clean work place; 11. Store tools and equipment appropriately.		Detailed knowledge about: 1.0. Methods: The person performing this task must be able to explain how to: 1.1. Adjust the distributor; 1.2. Tight the distributor; 1.3. Check Ignition Timing; 1.4. Adjust engine timing. 2.0. Principles: The person must be able to explain the principles involved in performing engine tune up. 3.0. Theories: The person must be able to explain: 3.1. Normal running conditions of Petrol Engines; 3.2. Ignition system components and operations.	

	4.0. Essential skills: 4.1. Communication skills; 4.2. Customer care skills; 4.3. Team work skills; 4.4. Report writing skills.
DESCRIPTION OF END PRODUCTS/SERVICE	Ignition systems is repaired as per technical specifications and manufacturer's manual.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Safe handling of working tools; 2. Safe handling of measuring instruments; 3. Maintenance operating policy and procedure (MOPP); 4. Waste disposal methods.

OCCUPATION	AUTOMOTIVE ENGINEER	OCCUPATION CODE	
DUTY TITLE	MAINTAIN ENGINE TUNE UP	DUTY NO.	404
TASK TITLE	ANALYSE EXHAUST GASES	TASK NO.	4044
PERFORMANCE CRITERIA	A person performing this task must be able to analyse automobile Exhaust Gases as per technical requirements and manufacturer service manual.		
RANGE STATEMENT	This task must be performed in the automotive workshop under the supervision of a senior Technician or Automotive/Mechanical Engineer The following tools and equipment will be required: 1. Full set of Automotive tool box; 2. Pitch/ramp/lifter; 3. Air Compressor; 4. High pressure vehicle Washing machine; 5. Power source; 6. Diagnosis Machines; 7. P.P.E, such as Safety Shoes, Glasses, Gloves.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Observe health and Safety when performing the task; 2. Select right tools and equipment for the task; 3. Check the assembly condition of the Exhaust gases; 4. Check the primary and secondary mufflers and each section of the exhaust pipe; 5. Check the Three-way Catalytic Convertor; 6. Check Oxygen Sensor; 7. Clean tools, equipment and workplace; 8. Store tools and equipment appropriately.		Detailed knowledge about: 1.0. Methods: The person performing this task must be able to explain how to: 1.1. Check the Exhaust gases; 1.2. Check the primary and secondary mufflers; 1.3. Check the three-way catalytic converter; 1.4. Check the oxygen sensor. 2.0. Principles: The person must be able to explain the principles of repairing Exhaust gases. 3.0. Theories: The person must be able to explain: 3.1. Normal operating conditions for gasoline and diesel engines; 3.2. Importance of Exhaust gases. 4.0. Essential skills: 4.1. Communication skills; 4.2. Customer care skills; 4.3. Team work skills; 4.4. Report writing skills.	
DESCRIPTION OF END PRODUCTS/SERVICE		Exhaust Gases are repaired as per technical specifications and Manufacturer’s manual.	
CIRCUMSTANTIAL KNOWLEDGE		Detailed knowledge about: 1. Safe handling of working tools; 2. Safe handling of measuring instruments;	

	3. Occupational health and safety; 4. Maintenance operating policy and procedure (MOPP); 5. Waste disposal methods.
--	---

OCCUPATION	AUTOMOTIVE ENGINEER	OCCUPATION CODE	
DUTY TITLE	MAINTAIN ENGINE TUNE UP	DUTY NO.	404
TASK TITLE	REPAIR AIR INDUCTION SYSTEM	TASK NO.	4045
PERFORMANCE CRITERIA	A person performing this task must be able to repair air induction system as per technical requirements and manufacturer service manual.		
RANGE STATEMENT	This task can be performed in the automotive workshop under the supervision of a senior Technician or Automotive/Mechanical Engineer. The following tools and equipment will be required: 1. Full set of Automotive tool box; 2. Exhaust gas analyser Machine; 3. Pitch/ramp/lifter; 4. Air Compressor; 5. Timing torch; 6. High pressure vehicle washing machine; 7. Power source; 8. Diagnosis Machines; 9. P.P.E, such as Safety Shoes, Glasses, Gloves; 10. Air compressor; 11. Stethoscope; 12. Compression Testers; 13. Vacuum gauges; 14. Pressure gauges.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Observe health and safety precautions when performing the task; 2. Select right tools and equipment for the task; 3. Inspect air induction system; 4. Clean the air cleaner; 5. Check Mass Air flow sensor; 6. Adjust air flow; 7. Check Vacuum Sensor; 8. Check Throttle Position Sensor; 9. Clean tools, equipment and work place; 10. Store tools and equipment safely; 11. Check throttle position sensor.		Detailed knowledge about: 1.0. Methods: The person performing this task must be able to explain how to: 1.1. Inspect air induction system; 1.2. Check Mass Air flow sensor; 1.3. Adjust air flow; 1.4. Check throttle position and throttle position sensors. 2.0. Principles: The person must be able to explain the principles of repairing Air Induction system. 3.0. Theories: The person must be able to explain: 3.1. Normal running conditions of Petrol and Diesel Engines; 3.2. Importance of Air Induction system. 4.0. Essential skills: 4.1. Communication skills;	

	4.2. Customer care skills; 4.3. Team work skills; 4.4. Report writing skills.
DESCRIPTION OF END PRODUCTS/SERVICE	Air Induction system is repaired and functioning as per technical specifications and manufacturer's manual.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Safe handling of working tools; 2. Safe handling of measuring instruments; 3. Occupational health and safety; 4. Maintenance operating policy and procedure (MOPP); 5. Waste disposal methods.

OCCUPATION	AUTOMOTIVE ENGINEER	OCCUPATION CODE	
DUTY TITLE	MAINTAIN ENGINE TUNE UP	DUTY NO.	404
TASK TITLE	PERFORM ENGINE TESTING	TASK NO.	4046
PERFORMANCE CRITERIA	A person performing this task must be able to perform engine testing as per technical requirements and manufacturer service manual.		
RANGE STATEMENT	This Task can be performed in the automotive workshop under the supervision of a senior Technician or Automotive/Mechanical Engineer. The following tools and equipment will be required: 1. Full set of Automotive tool box; 2. Exhaust gas analyser Machine; 3. Pitch/ramp/lifter; 4. Air Compressor; 5. Timing torch; 6. Washing machine; 7. Power source; 8. Diagnosis Machines; 9. P.P.E, such as Safety Shoes, Glasses, Gloves; 10. Compression tester for petrol/diesel engine; 11. Clamp meter; 12. Test lamp; 13. Air compressor; 14. Stethoscope; 15. Compression Testers; 16. Vacuum gauges; 17. Pressure gauges.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Observe health and safety precautions when performing the task; 2. Select right tools and equipment for the task; 3. Test Heater Plugs; 4. Test Injector nozzles; 5. Test Sparking Plugs; 6. Test cooling System; 7. Test Compression; 8. Test oil pump; 9. Test Fuel Pump; 10. Test Engine Brake; 11. Test turbo Charger; 12. Clean tools and equipment; 13. Clean work place; 14. Store tools and equipment		Detailed knowledge about: 1.0. Methods: The person performing this task must be able to explain how to: 1.1. Perform Engine testing; 1.2. Record output data; 1.3. Analyse engine normal running behaviour. 2.0. Principles: The person must be able to explain the principles of engine condition testing. 3.0. Theories: The person must be able to explain: 3.1. Normal running conditions of Petrol and Diesel Engines; 3.2. Importance of Engine Testing.	

appropriately.	4.0. Essential skills: 4.1. Communication skills; 4.2. Customer care skills; 4.3. Team work skills; 4.4. Report writing skills.
DESCRIPTION OF END PRODUCTS/SERVICE	Engine testing is performed as per technical specifications and Manufacturer's manual.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Safe handling of working tools; 2. Safe handling of measuring instruments; 3. Occupational health and safety; 4. Maintenance operating policy and procedure (MOPP); 5. Waste disposal methods.

OCCUPATION	AUTOMOTIVE ENGINEER	OCCUPATION CODE	
DUTY TITLE	MAINTAIN TRANSMISSION SYSTEMS	DUTY NO.	405
TASK TITLE	REPAIR THE CLUTCH SYSTEM	TASK NO.	4051
PERFORMANCE CRITERIA	A person performing this task must be able to repair the clutch system as per technical requirements and manufacturer’s specifications.		
RANGE STATEMENT	This task can be performed in automotive workshop under the supervision of a senior Technician or Automotive/Mechanical Engineer. The following tools and equipment will be required: 1. Full set of Automotive tool box; 2. Pitch/ramp/lifter; 3. Air Compressor; 4. Vehicle washing machine; 5. Power source; 6. Diagnosis machines; 7. P.P.E, such as Safety Shoes, Glasses, Gloves; 8. Test lamp; 9. Stethoscope; 10. Vacuum gauges; 11. Pressure gauges.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Observe health and safety precautions when performing the task; 2. Dismount gearbox; 3. Inspect the clutch linkage system; 4. Replace clutch plate; 5. Replace pressure plate; 6. Replace release bearing; 7. Remount gearbox; 8. Check clutch master cylinder; 9. Replace clutch master cylinder; 10. Check Clutch slave cylinder; 11. Replace clutch slave cylinder; 12. Refill clutch fluid; 13. Bleed the clutch system; 14. Clean tools, equipment and work place; 15. Store tools and equipment.		Detailed knowledge about: 1.0. Methods: The person performing this task must be able to explain how to repair and maintain transmission systems 2.0. Principles: The person must be able to explain the principles of: 2.1. Repairing transmission systems; 2.2. Repairing clutch systems. 3.0. Theories: The person must be able to explain: 3.1. Vehicle transmission system operation and maintenance; 3.2. Importance of repairing a clutch system. 4.0. Essential skills: 4.1. Communication skills; 4.2. Customer care skills; 4.3. Team work skills; 4.4. Report writing skills.	
DESCRIPTION OF END PRODUCTS/SERVICE		Clutch system is repaired as per technical requirements and Manufacturer’s specifications.	

CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Safe handling of working tools; 2. Safe handling of measuring instruments; 3. Maintenance operating policy and procedure (MOPP); 4. Waste disposal methods.
-------------------------------------	--

OCCUPATION	AUTOMOTIVE ENGINEER	OCCUPATION CODE	
DUTY TITLE	MAINTAIN TRANSMISSION SYSTEMS	DUTY NO.	405
TASK TITLE	REPAIR MANUAL GEARBOX	TASK NO.	4052
PERFORMANCE CRITERIA	A person performing this task must be able to repair manual gearbox as per technical requirements and manufacturer’s specifications.		
RANGE STATEMENT	This task can be performed in automotive workshop under the Supervision of a senior Technician or Automotive/Mechanical Engineer. The following tools and equipment will be required: 1. Full set of Automotive tool box; 2. Pitch/ramp/lifter; 3. Air Compressor; 4. Vehicle washing machine; 5. Power source; 6. Diagnosis machines; 7. P.P.E, such as Safety Shoes, Glasses, Gloves; 8. Gearbox container oil pump; 9. Stethoscope; 10. Vacuum gauges; 11. Pressure gauges.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Observe health and safety precautions when performing the task; 2. Select right tools and equipment for the task; 3. Dismount gearbox; 4. Disassemble the gearbox; 5. Replace the defective parts; 6. Assemble the gearbox; 7. Remount the gearbox to the vehicle; 8. Test the gearbox operation; 9. Clean tools, equipment and work place; 10. Store tools and equipment; 11. Parts cleaning and testing.		Detailed knowledge about: 1.0. Methods: The person performing this task must be able to explain how to: 1.1. Dismount; 1.2. Disassemble; 1.3. Assemble and; 1.4. Remount the gearbox. 2.0. Principles: The person must be able to explain the principles of: 2.1. Repairing transmission systems; 2.2. Repairing Manual gearbox. 3.0. Theories: The person must be able to explain: 3.1. Vehicle transmission system operation and maintenance; 3.2. Importance of manual gearbox. 4.0. Essential skills: 4.1. Communication skills; 4.2. Customer care skills; 4.3. Team work skills;	

	4.4. Report writing skills.
DESCRIPTION OF END PRODUCTS/SERVICE	Manual gearbox is repaired and functioning as per technical requirements and Manufacturer's specifications.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Safe handling of working tools; 2. Safe handling of measuring instruments; 3. Maintenance operating policy and procedure (MOPP); 4. Waste disposal methods.

OCCUPATION	AUTOMOTIVE ENGINEER	OCCUPATION CODE	
DUTY TITLE	MAINTAIN TRANSMISSION SYSTEMS	DUTY NO.	405
TASK TITLE	REPAIR AUTOMATIC GEARBOX	TASK NO.	4053
PERFORMANCE CRITERIA	A person performing this task must be able to repair automatic gearbox as per technical requirements and manufacturer’s specifications.		
RANGE STATEMENT	This task can be performed in automotive workshop under the Supervision of a senior Technician or Automotive/Mechanical Engineer. The following tools and equipment will be required: 1. Full set of Automotive tool box; 2. Pitch/ramp/lifter; 3. Air Compressor; 4. Vehicle washing machine; 5. Gearbox lifter; 6. Diagnosis machines; 7. P.P.E, such as Safety Shoes, Glasses, Gloves; 8. Test lamp; 9. Stethoscope; 10. Working bench; 11. Pressure gauges.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Observe health and safety when performing the task; 2. Select right tolls and equipment for the task; 3. Dismount the Gearbox; 4. Observe Safety measures; 5. Drain the gearbox oil; 6. Disassemble gearbox; 7. Inspect parts; 8. Replace the new parts; 9. Assemble the Gearbox; 10. Oil plug; 11. Mount the gearbox to the vehicle; 12. Top up automatic transmission fluid (ATF); 13. Program automatic gearbox; 14. Test performance; 15. Clean tools, equipment and work place; 16. Store tools and equipment; 17. Parts cleaning and testing.		Detailed knowledge about: 1.0. Methods: The person performing this task must be able to explain how to: 1.1. Drain the gearbox oil; 1.2. Disassemble gearbox; 1.3. Inspect parts; 1.4. Assemble the Gearbox. 2.0. Principles: The person must be able to explain the principles of: 2.1. Repairing transmission systems; 2.2. Repairing automatic gearbox. 3.0. Theories: The person must be able to explain: 3.1. Vehicle transmission system operation and Maintenance; 3.2. Programming automatic gearbox. 4.0. Essential skills: 4.1. Communication skills; 4.2. Customer care skills; 4.3. Team work skills;	

	4.4. Report writing skills.
DESCRIPTION OF END PRODUCTS/SERVICE	Automatic gearbox is repaired and functioning as per technical requirements and Manufacturer's specifications.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Safe handling of working tools; 2. Safe handling of measuring instruments; 3. Maintenance operating policy and procedure (MOPP); 4. Waste disposal methods.

OCCUPATION	AUTOMOTIVE ENGINEER	OCCUPATION CODE	
DUTY TITLE	MAINTAIN TRANSMISSION SYSTEMS	DUTY NO.	405
TASK TITLE	REPAIR PROPELLER SHAFT	TASK NO.	4054
PERFORMANCE CRITERIA	A person performing this task must be able to repair a propeller shaft as per technical requirements and manufacturer’s specifications;		
RANGE STATEMENT	This task can be performed in automotive workshop under the supervision of a senior Technician or Automotive/Mechanical Engineer. The following tools and equipment will be required: 1. Full set of Automotive tool box; 2. Pitch/ramp/lifter; 3. Air Compressor; 4. Vehicle washing machine; 5. Gearbox lifter; 6. Diagnosis machines; 7. P.P.E, such as Safety Shoes, Glasses, Gloves; 8. Grease pump machine; 9. Stethoscope; 10. Working bench; 11. Pressure gauges; 12. Automatic transmission fluid (ATF) filling cane.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Observe health and safety precautions when performing the task 2. Select right tools and equipment for the task; 3. Dismount the propeller shaft; 4. Inspect Universal joints; 5. Repair universal joints; 6. Inspect Sliding joints; 7. Service sliding joints; 8. Grease the propeller shaft; 9. Mount the Propeller shaft; 10. Test performance; 11. Clean tools, equipment and work place; 12. Store tools and equipment.		Detailed knowledge about: 1.0. Methods: The person performing this task must be able to explain how to: 1.1. Repair universal joints; 1.2. Inspect Sliding joints; 1.3. Service sliding joints; 1.4. Align a propeller shaft. 2.0. Principles: The person must be able to explain the principles of: 2.1. Repairing transmission systems. 2.2. Repairing propeller shaft 3.0. Theories: The person must be able to explain: 3.1. Propeller shaft construction; 3.2. Importance of aligning a propeller shaft; 3.3. Causes for misalignment of a propeller shaft. 4.0. Essential skills: 4.1. Communication skills; 4.2. Customer care skills;	

	4.3. Team work skills; 4.4. Report writing skills.
DESCRIPTION OF END PRODUCTS/SERVICE	Propeller shaft is repaired and aligned as per technical requirements and Manufacturer's specifications.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Safe handling of working tools; 2. Safe handling of measuring instruments; 3. Maintenance operating policy and procedure (MOPP); 4. Waste disposal methods.

OCCUPATION	AUTOMOTIVE ENGINEER	OCCUPATION CODE	
DUTY TITLE	MAINTAIN TRANSMISSION SYSTEMS	DUTY NO.	405
TASK TITLE	REPAIR DIFFERENTIAL UNITS	TASK NO.	4055
PERFORMANCE CRITERIA	A person performing this task must be able to repair differential units as per technical requirements and manufacturer’s specifications.		
RANGE STATEMENT	This task can be performed in automotive workshop under the Supervision of a senior Technician or Automotive/Mechanical Engineer. The following tools and equipment will be required: 1. Full set of Automotive tool box; 2. Pitch/ramp/lifter; 3. Air Compressor; 4. Vehicle washing machine; 5. Gearbox lifter; 6. Diagnosis machines; 7. P.P.E, such as Safety Shoes, Glasses, Gloves; 8. Grease pump machine; 9. Stethoscope; 10. Working bench; 11. Pressure gauges; 12. Automatic transmission fluid (ATF) filling cane.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Observe health and safety precautions when performing the task; 2. Select right tools and equipment for the task; 3. Dismount the Differential unit; 4. Inspect the differential unit; 5. Disassemble differential unit; 6. Adjust differential unit for backlash; 7. Check for pinion preload and adjust; 8. Check the Crown wheel for run out; 9. Assemble the Differential unit; 10. Inspect the Drive Axle; 11. Test the operation; 12. Mount the differential unit; 13. Mount the Axle shaft; 14. Clean tools, equipment; 15. Store tools and equipment.		Detailed knowledge about: 1.0. Methods: The person performing this task must be able to explain how to: 1.1. Dismount the Differential unit; 1.2. Disassemble differential unit; 1.3. Adjust differential unit for backlash; 1.4. Check for pinion preload and adjust; 1.5. Check the Crown wheel for run out. 2.0. Principles: The person must be able to explain the principles of: Repair differential units. 3.0. Theories: The person must be able to explain: 3.1. The function of a differential unit in an automobile and how it works; 3.2. Types of differentials; 3.3. Differential units; 3.4. Need to adjust differential units; 3.5. Differential locking devices.	

	4.0. Essential skills: 4.1. Communication skills; 4.2. Customer care skills; 4.3. Team work skills; 4.4. Report writing skills.
DESCRIPTION OF END PRODUCTS/SERVICE	Differential units are repaired and functioning as per technical requirements and Manufacturer's specifications.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Safe handling of working tools; 2. Safe handling of measuring instruments; 3. Maintenance operating policy and procedure (MOPP); 4. Waste disposal methods.

OCCUPATION	AUTOMOTIVE ENGINEER	OCCUPATION CODE	
DUTY TITLE	MAINTAIN TRANSMISSION SYSTEMS	DUTY NO.	405
TASK TITLE	REPAIR TYRES PUNCTURES	TASK NO.	4056
PERFORMANCE CRITERIA	A person performing this task must be able to repair tyres as per technical requirements and manufacturer’s specifications.		
RANGE STATEMENT	This task can be performed in automotive workshop under the supervision of a senior Technician or Automotive/Mechanical Engineer. The following tools and equipment will be required: 1. Full set of Automotive tool box; 2. Jack/lifter; 3. Air Compressor; 4. Diagnosis machines; 5. P.P.E, such as Safety Shoes, Glasses, Gloves; 6. Tyre remover; 7. Work bench; 8. Pressure gauges; 9. Tyre changer/dynamic balancer.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Observe health and safety when performing the task; 2. Select right tools and equipment for the task; 3. Chock the vehicle; 4. Jack up; 5. Remove the tyre; 6. Check tyre pressure; 7. Examine causes for tyre puncture; 8. Inspect tyre for embedded objects in treads; 9. Remove foreign objects in the tyre; 10. Repair puncture for the tyre tube or tubeless tyre; 11. Refill the tyre with correct pressure; 12. Refit the tyre; 13. Remove the jack; 14. Remove the chocks; 15. Clean tools, equipment and work place; 16. Store tools and equipment.		Detailed knowledge about: 1.0. Methods: The person performing this task must be able to explain how to: 1.1.Repair puncture on tyre tubes; 1.2.Repair puncture on tubeless tyre; 1.3. Perform tyre changing; 1.4. Perform tyre Switching; 1.5. Final drive operation and maintenance. 2.0. Principles: The person must be able to explain the principles of repair wheels and tyres. 3.0. Theories: The person must be able to explain: 3.1. Types, sizes and Designations of tyres; 3.2. Tyre markings and their interpretation; 3.3. Tyre correct pressure; 3.4. The proper safety precautions applicable to working on Tyres; 3.5. Construction and Features of Automobile Tyres; 3.6. Run Flat Tyres (RFT). 4.0. Essential skills: 4.1. Communication skills;	

17. Dynamic balancing test	4.2. Customer care skills; 4.3. Team work skills; 4.3. Report writing skills.
DESCRIPTION OF END PRODUCTS/SERVICE	Tyre puncture is repaired as per technical requirements and Manufacturer's specifications.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Safe handling of working tools; 2. Safe handling of measuring instruments; 3. Maintenance operating policy and procedure (MOPP); 4. Waste disposal methods.

OCCUPATION	AUTOMOTIVE ENGINEER	OCCUPATION CODE	
DUTY TITLE	MAINTAIN TRANSMISSION SYSTEMS	DUTY NO.	405
TASK TITLE	PERFORM TYRE - WEAR DIAGNOSIS	TASK NO.	4057
PERFORMANCE CRITERIA	A person performing this task must be able to perform tyre wear diagnosis as per technical requirements and manufacturer’s specifications.		
RANGE STATEMENT	This task can be performed in automotive workshop under the supervision of a senior Technician or Automotive/Mechanical Engineer. The following tools and equipment will be required: 1. Full set of Automotive tool box; 2. Pitch/ramp/lifter; 3. Air Compressor; 4. Vehicle washing machine; 5. Gearbox lifter; 6. Diagnosis machines; 7. P.P.E, such as Safety Shoes, Glasses, Gloves; 8. Tyre remover; 9. Wheel balancing machine; 10. Wheel alignment machine; 11. Work bench; 12. Pressure gauges.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
1. The person performing this task must be able to do the following; 2. Observe health and safety when performing the task; 3. Select right tools and equipment for the task; 4. Chock the vehicle; 5. Check for signs of wear on all tyres including the spare tyre; 6. Check tyre wear patterns; 7. Check tread wear depth and patterns; 8. Check tyre for damage; 9. Determine the cause for tyre wear; 10. Replace a worn out or expired tyres; 11. Perform wheel balancing for the replaced tyre; 12. Perform wheel balancing; 13. Clean tools, equipment and work		Detailed knowledge about: 1.0. Methods: The person performing this task must be able to explain how to: 1.1. Maintain wheels and tyres; 1.2. Identify tyre markings; 1.3. Perform tyre changing; 1.4. Perform tyre Switching; 1.5. Final drive operation and maintenance. 2.0. Principles: The person must be able to explain the principles of Repairing and replacing tyres. 3.0. Theories: The person must be able to explain: 3.1 Types and sizes of tyres; 3.2 Construction and Features of Tyres; 3.3 Tyre Sizes & Designations; 3.4 Tyre Tread Designs; 3.5 Primary Data on Automobile Tyres;	

place; 14. Store tools and equipment; 15. Perform four-wheel alignment according to wear and tear.	3.6 The proper safety precautions applicable to working on Tyres; 3.7 Tyre Ratings for Temperature & Traction; 3.8 Tyre removal and refitting, lubricant used, bead undamaged and secure to rim, correct pressure; 3.9 'Space-Saver' Tyres; 3.10 Run Flat Tyres (RFT); 3.11 Tyre Condition and Patterns of Wear and correction measures; 3.12 Need for Wheel balancing and alignment after tyre repair. 4.0. Essential skills: 4.1 Communication skills; 4.2 Customer care skills; 4.3 Team work skills; 4.4 Report writing skills.
DESCRIPTION OF END PRODUCTS/SERVICE	Tyre- wear diagnosis is performed as per technical requirements and manufacturer's specifications.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Safe handling of working tools; 2. Safe handling of measuring instruments; 3. Maintenance operating policy and procedure (MOPP); 4. Waste disposal methods.

OCCUPATION	AUTOMOTIVE ENGINEER	OCCUPATION CODE	
DUTY TITLE	MAINTAIN TRANSMISSION SYSTEMS	DUTY NO.	405
TASK TITLE	REPAIR WHEELS	TASK NO.	4058
PERFORMANCE CRITERIA	A person performing this task must be able to repair wheels as per technical requirements and manufacturer’s specifications.		
RANGE STATEMENT	This task can be performed in automotive workshop under the supervision of a senior Technician or Automotive/Mechanical Engineer. The following tools and equipment will be required: 1. Full set of Automotive tool box; 2. Pitch/ramp/lifter; 3. Air Compressor; 4. Diagnosis machines; 5. P.P.E, such as Safety Shoes, Glasses, Gloves; 6. Grease pump machine; 7. Work bench; 8. Pressure gauges; 9. Wheel balancing machine; 10. Wheel alignment machine.		
EVIDENCE REQUIREMENTS			
PRACTICAL PERFORMANCE		UNDERPINNING KNOWLEDGE	
The person performing this task must be able to do the following: 1. Observe health and safety when performing the task; 2. Select right tools and equipment for the task; 3. Chock the vehicle; 4. Check for wheel bearing Play; 5. Jack the wheel; 6. Inspect wheel bearing; 7. Replace wheel bearing; 8. Replace seal; 9. Adjust wheel bearing; 10. Fit axle shaft; 11. Remove the jack and chocks; 12. Clean tools, equipment and work place; 13. Store tools and equipment.		Detailed knowledge about: 1.0. Methods: The person performing this task must be able to explain how to: 1.1. Maintain wheels; 1.2. Perform wheel balancing; 1.3. Perform wheel alignment; 1.4. Perform tyre Switching; 1.5. Replace Wheel bearing and seal; 1.6. Adjust wheel bearing; 1.7. Jack the wheel. 2.0. Principles: The person must be able to explain the principles of repairing wheels for automobiles. 3.0. Theories: The person must be able to explain: 3.1. Types and sizes of wheels; 3.2. Construction and Features of Wheels; 3.3. Rim Sizes & Designations; 3.4. Wheels components and operations; 3.5. The proper safety precautions applicable to working on Wheels; 3.6. Tyre removal and refitting, lubricant used, bead	

	undamaged and secure to rim, correct pressure. 3.7. The need for Wheel balancing and alignment; 4.0. Essential skills: 4.1. Communication skills; 4.2. Customer care skills; 4.3. Team work skills; 4.4. Report writing skills.
DESCRIPTION OF END PRODUCTS/SERVICE	Wheels are repaired as per technical requirements and Manufacturer's specifications.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Safe handling of working tools; 2. Safe handling of measuring instruments; 3. Maintenance operating policy and procedure (MOPP); 4. Waste disposal methods.

TABLE 1: DACUM CHARTS FOR AUTOMOTIVE ENGINEERS NTA LEVEL 4

DUTIES	TASKS	ENABLERS
1.0 Perform Vehicle General Service.	1.1. Conduct under hood inspection. 1.2. Conduct vehicle walk around inspection. 1.3. Perform engine service. 1.4. Perform gearbox service. 1.5. Perform differential service. 1.6. Perform greasing. 1.7. Maintain hydraulic systems.	Generic skills and knowledge • Using communication skills to work with others, reporting to superiors • Use of manufacturer's manual • skills and knowledge on Engine components and operation • Machine elements • Interpretation of technical drawing • Basic Material science Tools and Equipment • PPE such as Safety Shoes, Glasses, Gloves, • Inspection Lamps • Auto-data, Inspection lamps, Vehicle Manuals books and • Full set of automotive tools box Materials Grease, OIL and Fuel filters worker behaviours Team spirit, trustworthy, time management and commitment
2.0. Maintain Petrol Engine.	2.1. Dismount petrol engine from the vehicle. 2.2. Perform petrol engine overhaul. 2.3. Perform petrol engine	Generic skills and knowledge • Using communication skills to work with others, reporting to superiors • Use of manufacturer's manual

DUTIES	TASKS	ENABLERS
	remounting to the vehicle.	- skills and knowledge on Engine and its operation. - Machine elements - Interpretation of technical drawing - Basic Material science Tools and Equipment - PPE such as Safety Shoes, Glasses, Gloves, - Automotive Full tool box. - Engine Special Tools as per Technical Specifications - Engine Measuring tools Materials New spare parts as per technical specifications, Petrol Fuel Worker Behaviours Team spirit, trustworthy, time management and commitment
3.0. Maintain Diesel Engine.	3.1. Dismount diesel engine. 3.2. Perform diesel engine overhaul. 3.3. Perform diesel engine remounting.	Generic skills and knowledge - Using communication skills to work with others, reporting to superiors - Use of manufacturer's manual - skills and knowledge on Engine and its operation. - Machine elements - Interpretation of technical drawing - Basic Material science Tools and Equipment

DUTIES	TASKS	ENABLERS
		• PPE such as Safety Shoes, Glasses, Gloves, • Automotive Full tool box. • Engine Special Tools as per Technical Specifications • Engine Measuring tools Materials New spare parts as per technical specifications, Diesel Fuel worker behaviours Team spirit, trustworthy, time management and commitment
4.0. Maintain Engine Tune Up.	4.1. Adjust engine systems. 4.2. Repair fuel system. 4.3. Repair ignition system. 4.4. Analyse exhaust gases. 4.5. Repair air induction system. 4.6. Perform engine testing.	Generic skills and knowledge • Using communication skills to work with others, reporting to superiors • Use of manufacturer's manual • skills and knowledge on Engine Systems Operation. • Machine elements • Interpretation of technical drawing • Basic Material science Tools and Equipment • PPE such as Safety Shoes, Glasses, Gloves, Hearing Protection, Hard Hats. • Full automotive tool box. • Compression Tester • Exhaust gas analyser Machine Materials

DUTIES	TASKS	ENABLERS
		• Gaskets, seals and Screws worker behaviours Team spirit, trustworthy, time management and commitment
5.0. Maintain Transmission systems.	5.1. Repair the Clutch system. 5.2. Repair manual gear box. 5.3. Repair automatic gear box. 5.4. Repair propeller shaft. 5.5. Repair differential system. 5.6 Repair tyre punctures. 5.7. Diagnose tyre wear. 5.8. Repair wheels.	Generic skills and knowledge • Using communication skills to work with others, reporting to superiors • Use of manufacturer's manual • skills and knowledge on Vehicle Transmission systems • Machine elements • Interpretation of technical drawing • Basic Material science Tools and Equipment • PPE such as Safety Shoes, Glasses, Gloves, Hearing Protection, Hard Hats. • Full automotive Tool box • Wheel balancing Machine • Tyre Changer Machine Materials Gearbox oil, Grease as per technical specifications Worker Behaviours Team spirit, trustworthy, time management and commitment