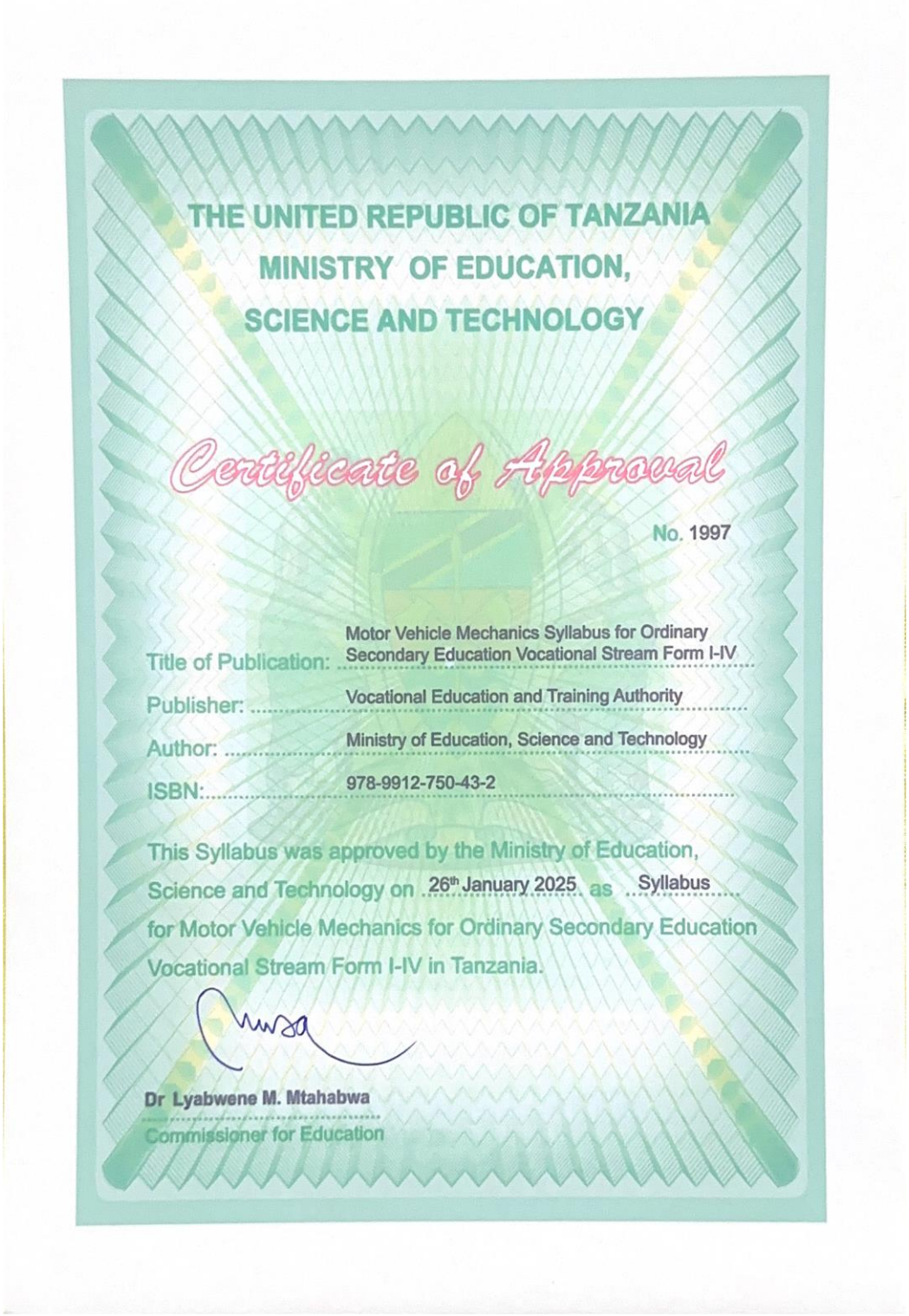
THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY



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Dr Lyabwene M. Mtahabwa
Commissioner for Education

MOTOR VEHICLE MECHANICS SYLLABUS FOR ORDINARY SECONDARY EDUCATION VOCATIONAL STREAM FORM I – IV

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Abbreviations and Acronyms

ABS	Anti-lock Braking System
AC	Alternating Current
ATPM	Automatic Tire Pressure Monitoring System
BDC	Bottom Dead Centre
BPMV	Brake Pneumatic Modulator Valve
BTDC	Before Top Dead Centre
C.B	contact breaker
DC	Direct Current
EBCM	Electronic Brake Control Module
EBS	Electronic Brake System
ECU	Electronic Control Unit
ECM	Electronic Control Module
EFI	Electronic Fuel Injection
EPM	Electronic Pneumatic Modulator
HID	High-Intensity Discharge
HVAC	Heat Ventilation and Air Conditioning
LED	Light-Emitting Diode
MVM	Motor Vehicle Mechanics
OBD	On Board Diagnostic
SAE	Society of Automotive Engineers
TCS	Traction Control System
TDC	Top Dead Centre
TPMS	Tire Pressure Monitoring System

Definition of Key Terms

Assessment: The process of collecting evidence and making judgments on whether competency has been achieved, or whether specific skills and knowledge have been achieved that will lead to attaining competency.

Circumstantial knowledge: Detailed knowledge, which allows decision-making regarding 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.

Element: A sub-unit (step), which reflects the learning sequence to achieve the broad learning objectives of a unit.

Performance criteria: Indicate the expected results or outcome in the form of evaluative statements.

Standard: A set of statements, which if proved true under working conditions means that an individual is meeting an expected level and type of performance.

Unit: A statement of broad learning objectives, which prescribe the requirements of a standard in the form of practical skills, knowledge and appropriate attitudes.

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For and on behalf of:

Vocational Education and Training Authority

CPA. Anthony M. Kasore

Director General

1.0. Introduction

Motor Vehicle Mechanics is one of the occupations taught in the Ordinary Secondary Education Vocational Stream. Learning Motor Vehicle Mechanics is essential because, in Tanzania, the number of vehicles is significantly increasing. These vehicles can be normal, hybrid vehicles and even electric vehicles which contain mechanical, electrical and electronic system which needs services and maintenance. By teaching Motor vehicle mechanics, students will develop knowledge and practical skills that enable them to service, maintain, and troubleshoot vehicle mechanical, electrical and electronic systems. It includes diagnosing and rectifying faults, installing and servicing mechanical, electrical and electronic systems, and ensuring the proper performance and functioning of different systems like cooling systems, starting systems, charging systems, lighting systems, and vehicle sensors. In return, this will foster economic development, create jobs, promote environmental sustainability, and preserve cultural heritage.

Upon completion of the programme, students will possess both theoretical and practical knowledge of motor vehicle mechanics, from basic components identification to advanced system troubleshooting. They will be capable of using tools and equipment to troubleshoot vehicle systems, and implementing sustainable practices in the industry while adhering to safety regulations. Additionally, students will be equipped with the business skills necessary for managing Motor vehicle mechanics enterprise, ensuring high standards of quality and services in all aspects of the Motor vehicle mechanics.

A graduate of this occupation may be employed in both Government and private sectors such as ministries/departments, training institutions, research institutions automotive workshops dealings with motor vehicles, construction machinery, agricultural machinery, power plants and, self-employment, small, medium and large vehicles industries and in Non-Governmental Organizations (NGOs).

The Motor Vehicle Mechanics Syllabus is designed to guide the teaching and learning of Motor vehicle mechanics at Ordinary Secondary Education Form I-IV Vocational Stream in the United Republic of Tanzania. The Syllabus interprets the competences a student needs to develop while learning Motor vehicle mechanics. It contains valuable information that will enable teachers to plan effectively their teaching process and help learners to develop the intended competences.

2.0. Main Objectives of Education in Tanzania

The main objectives of education in Tanzania are to enable every Tanzanian to:

(a) Develop and improve his or her personality so that he or she values himself or herself and develops self-confidence;

(b) Respect the culture, traditions, norms and customs of Tanzania; cultural differences; dignity; human rights; attitudes and inclusive actions;

(c) Advance knowledge and apply science and technology, creativity, critical thinking, innovation, cooperation, communication and positive attitudes for his or her development and the sustainable development of the nation and the world at large;

(d) Understand and protect national values, including dignity, patriotism, integrity, unity, transparency, honesty, accountability and the national language;

(e) Develop life and work-related skills to increase efficiency in everyday life;

(f) Develop a habit of loving and valuing work to increase productivity and efficiency in production and service provision;

(g) Identify and consider cross-cutting issues, including the health and well-being of the society, gender equality, as well as the management and sustainable conservation of the environment; and

(h) Develop national and international cooperation, peace and justice per the Constitution of the United Republic of Tanzania and international conventions.

3.0. General Competencies for Ordinary Secondary Education Vocational Stream

The general competences for Ordinary Secondary Education, Form I–IV, Vocational Education stream is to:

(a) Apply the knowledge, skills and attitudes the student developed in the primary school stage to increase his/her understanding of technical skills;

(b) Apply technical skills in designing, inventing and making various things to cope with life and solve challenges in society;

(c) Appreciate citizenship and national virtues;

(d) Use language skills;

(e) Demonstrate self-confidence in learning in various fields, including science and technology, technical knowledge and technical skills;

(f) Apply technical knowledge and skills in designing, discovering and making various things to solve challenges in society, including cross-cutting issues;

(g) Appreciate procedures and safety rules in using technical tools correctly; and

(h) Apply the technical knowledge and skills acquired to develop oneself with vocational and technical education and join the workforce.

4.0. General Competences of the Occupation

Upon completion of this occupation, students are expected to have the ability to:

(a) Demonstrate the principles of workshop management to maintain occupational health, safety rules and regulations;

(b) Demonstrate the basic principles of maintaining, using and storing tools and equipment to troubleshoot and service different motor vehicle systems;

(c) Apply the knowledge and technical skills developed to interpret, diagnose and rectify different components of motor vehicle systems;

(d) Apply the knowledge and technical skills developed to service motor vehicle mechanics;

(e) Perform vehicle maintenance and servicing sustainably;

(f) Diagnose and repair automotive systems and components;

(g) Maintain safety and health awareness in automotive workshops;

(h) Manage automotive repair and service operations; and

(i) Maintain tools, equipment, and machinery used in motor vehicle repair.

5.0. Main and Specific Competences

The main and specific competences to be developed are presented in Table 1

Table 1: *Main and Specific Competences for Form I-IV*

Modules (Main Competence)	Units (Specific competences)
1.1 Maintaining the safety of the workshop and surroundings	1.1. Maintaining workshop safety 1.2. Handling accidents and incidents 1.3. Handling fire accidents 1.4. Performing first aid
2.0 Maintaining workshop safety	2.1 Performing cutting 2.2 Performing filing 2.3 Performing drilling 2.4 Performing riveting 2.5 Performing threading 2.6 Performing metal forming
4.0 Preforming welding and fabrication	5.0 Performing arc welding 5.1 Performing gas welding 5.2 Performing soldering
5.0 Maintaining wheels and tyres	5.1 Repairing tubed tyres 5.2 Repairing tubeless tyres 5.3 Performing wheel balancing 5.4 Serving wheel hubs 5.5 Servicing automatic tyre pressure monitoring system
6.0 Carrying out general vehicle services	6.1 Performing service of engine lubrication systems 6.2 Performing service of fuel system 6.3 Servicing cooling systems 6.4 Performing service of transmission systems 6.5 Performing greasing
7.0 Carrying out general maintenance on electrical and electronic systems	7.1 Maintaining batteries 7.2 Constructing simple electronic circuits 7.3 Constructing simple electronic circuits 7.4 Servicing conventional ignition system 7.5 Servicing electronic ignition systems 7.6 Maintaining the lighting system 7.7 Servicing accessories circuits and components
8.0 Maintaining suspension system	8.1 Replacing suspension bushes 8.2 Replacing suspension shock absorbers 8.3 Troubleshooting air suspensions 8.4 Servicing air (pneumatic) suspension components
9.0 Maintaining brake system	8.1 Servicing hydraulic brake system components 8.2 Servicing drum brakes 8.3 Servicing disc brakes 8.4 Servicing anti-lock brake system (ABS) 8.5 Servicing pneumatic brakes 8.6 Servicing electronically controlled brake system (EBS)
10.0 Maintaining steering system	10.1 Performing wheel alignment 10.2 Servicing steering boxes 10.3 Servicing power steering systems
11.0 Carrying out engine maintenance	11.1 Diagnosing engine performance 11.2 Dismantling engines 11.3 Servicing cylinder head 11.4 Performing cylinder block measurements

Modules (Main Competence)	Units (Specific competences)
	11.5 Performing crankshaft measurements 11.6 Checking connecting rods 11.7 Checking piston wear 11.8 Assembling engine 11.9 Carrying out ignition system 11.10 Adjust valve clearance
12.0 Maintaining fuel system	12.1 Servicing petrol fuel system 12.2 Servicing natural gas fuel system 12.3 Repairing diesel fuel system
13.0 Maintaining emission control system	13.1 Servicing catalytic converter 13.2 Servicing oxygen sensor 13.3 Repairing exhaust system
14.0 Maintaining engine enhancing	14.1 Servicing supercharger 14.2 Overhauling turbocharger 14.3 Servicing exhaust gas recirculation system 14.4 Servicing engine retarder
15.0 Maintaining power transmission system	15.1 Maintaining clutch systems 15.2 Maintaining manual gearboxes 15.3 Maintaining final drive unit
16.0 Maintaining simple hydraulic system and components	16.1 Diagnosing basic hydraulic system 16.2 Servicing basic hydraulic system components
17.0 Performing lathe machine operation	17.1 Performing turning 17.2 Performing thread-cutting 17.3 Performing boring
18.0 Maintaining heating ventilation and air conditioning system	18.1 Servicing air conditioning system components 18.2 Servicing air-conditioning heating system components
19.0 Maintaining fuel injection system	19.1 Servicing electronically controlled gasoline injection components 19.2 Servicing Electronic controlled diesel injection system
20.0 Maintaining electrical components	20.1 Servicing starter motor 20.2 Servicing alternators
21.0 Servicing automatic transmission	21.1 Trouble-shooting conventional automatic transmission 21.2 Trouble-shooting electrically controlled automatic transmission
22.0 Managing safety work environment	22.1 Managing hazards 22.2 Carrying out risk assessment

Modules (Main Competence)	Units (Specific competences)
	22.3 Managing environment
23.0 Managing Preventive Maintenance	23.1 Planning preventive maintenance 23.2 Supervising preventive maintenance
24.0 Managing Workshop Activities	24.1 Designing workshop layout 24.2 Controlling tools and equipment 24.3 Estimating materials and labour 24.4 Performing on-job training to subordinate 24.5 Preparing report 24.6 Managing workshop business

6.0. The Roles of Teachers, Students, and Parents in Teaching and Learning

Good relationships between a teacher, student parent, or guardian are fundamental to ensuring successful learning. This section outlines the roles of each participant in facilitating effective teaching and learning of Motor Vehicle Mechanics.

6.1. The teacher

The teacher is expected to:

(a) Help the students to learn and develop the intended competences in Motor Vehicle Mechanics;

(b) Use teaching and learning approaches that will allow students with different needs and abilities to:

  (i) Develops the competences needed in the 21st Century; and

  (ii) Actively participate in the teaching and learning process.

(c) Use student-centred instructional strategies that make the student a centre of learning which allows them to think, reflect and search for information from various sources;

(d) Create a friendly teaching and learning environment;

(e) Prepare and improvise teaching and learning resources;

(f) Conduct formative assessment regularly by using tools and methods which assess theory and practice;

(g) Treat all the students according to their learning needs and abilities;

(h) Protect the student from the risky environment while he or she is at school;

(i) Keep track of the student's daily progress;

(j) Identify individual student's needs and provide the proper intervention;

(k) Involve parents/guardians and the society at large in the student's learning process; and

(l) Integrate cross-cutting issues and ICT in the teaching and learning process.

6.2. The student

The student is expected to:

(a) Develop the intended competences by participating actively in various learning activities inside and outside the classroom; and

(b) Participate in the search for knowledge from various sources, including textbooks, reference books and other publications in online libraries.

6.3. The parent/guardian

The Parents/Guardian is expected to:

(a) Monitor the child's academic progress in school;

(b) Where possible, provide a child with the needed academic support;

(c) Provide a child with a safe and friendly home environment which is conducive to learning;

(d) Keep track of a child's progress in behaviour;

(e) Provide the child with any necessary materials required in the learning process; and

(f) Instil in a child a sense of commitment and positive value towards education and work.

7.0. Teaching and Learning Methods

The teaching and learning methods are instrumental in developing student's competences. This Syllabus suggests teaching and learning methods for each activity which includes but is not limited to demonstration, practical/hands-on activities, observations, role play, simulation, group works, peer teaching/learning, discussions, presentations, field visits, research, and project works. However, a teacher is advised to plan and use other appropriate methods based on the environment or context. All the teaching and learning methods should be integrated with the everyday lives of students. The focus is expected to be on practical application and developing cognitive, affective, and psychomotor skills through learner-centred methods. Vocational teachers act as facilitators, incorporating both school-based teaching and project work supervision.

8.0. Teaching and Learning Resources

The process of teaching and learning requires different resources. In that regard, both a teacher and students should work together to collect or improvise alternative resources available in the school and home environment when needed. Teachers and students are expected to constantly seek information from various sources to effectively facilitate the teaching and learning process. The list of approved textbooks and reference books shall be provided by the Tanzania Institute of Education (TIE).

9.0. Assessment

Assessment is important in teaching and learning Motor Vehicle Mechanics It is divided into formative and summative assessments. Formative assessment informs both the teacher and students on the progress of teaching and learning, and in making decisions on improving the teaching and learning process. Teachers are, therefore, expected to apply a wide range of formative assessment methods which include but are not limited to demonstrations, discussions, presentations, oral questions, experiments, observations, practical assignments and projects.

Summative assessment, on the other hand, focuses on determining student's achievement of learning. Teachers are expected to use a variety of summative assessments including Form Two National Assessment, terminal examination, annual examination, mock examination and project. The scores obtained from these assessments will be used as Continuous Assessment (CA). Therefore, the continuous assessments shall contribute 60% while the National Form IV Examination shall be 40% as indicated in Table 2.

9.1 Project Work

Project work is a carefully planned and clearly defined task or problem that a student undertakes, either alone or in a group, to enhance and apply the skills and knowledge gained in the classroom, workshop, kitchen, or laboratory. It is based on the principles of "Learning by Doing" and "Learning by Living." In this context, the implementation of Project Work in secondary schools' vocational streams is essential. A project in the vocational stream should be conducted in the core subject (occupation). To ensure its success, the supervision and assessment of student project work must be consistent with the established guidelines provided by the National Examinations Council of Tanzania (NECTA).

Table 2: *Contribution of Continuous Assessment and National Examination in the final score*

Assessment Category	**Weight (%)**	**National Examination**
Form Two National Assessment (FTNA)	6.0	**40**
Form Three Terminal Examination	5.0	
Form Three Annual Examination	5.0	
Form Four Mock Examination	7.0	
Project	7.0	
Form Two Practical	10.0	
Form Three Practical	10.0	
Form Four Practical	10.0	
Total	**60**	

10.0. Number of Periods

The Motor Vehicle Mechanics Syllabus for Ordinary Secondary Education Vocational Stream Form I-IV provides time estimates for teaching and learning each specific competence. The estimates consider the complexity of the specific competences and the learning activities. Eight (08) periods of 40 minutes each have been allocated per week, whereby two (02) periods will be used for theory and 6 for practical sessions which may require double periods (e.g., 80). Double periods will allow sufficient time for hands-on activities.

11.0. Teaching and Learning Contents

The contents of the Syllabus are organised into a matrix with seven (07) columns which are main competences, specific competences, learning activities, suggested teaching and learning methods, assessment criteria (divided into process assessment, products/service assessment and underpinning knowledge), suggested teaching and learning resources, and number of periods as presented in Table 3 to 6.

Form One

Table 3: *Detailed contents for Form One*

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
1.0 Maintaining the safety of the workshop and surroundings	1.1 Maintaining workshop safety	(a) Maintaining workshop safety rules	**Brainstorming:** Use questions and answers to guide students to explore the principles related to maintaining workshop safety rules and regulations **ICT-based learning:** Guide students to visualise various workshop safety rules and regulations **Group Discussion:** Guide the students in manageable groups to discuss and familiarise with the concepts of workshop safety rules	**The student should be able to:** •Maintain workshop •Interpret different safety signs in the workshop •Draw safety signs •Maintain personal environments •Clean workshop, tools, equipment, and workshop surroundings •Store equipment and safety gears •Apply safety gears	Workshop safety rules and regulations maintained as per instructions	**Knowledge evidence: Detailed knowledge of: Method used:** The student should explain how to: • Maintain workshop safety • Dispose of different types of wastes • Clean workshop, tools, equipment, and machines safely **Principles:** The student should explain the principles of: • Workshop cleaning	The following tools, equipment and safety gears are to be available: • Safety signage and posters • Fire extinguisher • Workshop layout • Emergency preparedness • Procedural components • Tools and equipment • Safety gears (PPE) • House keeping • First aid kit • Video, multimedia	32

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						• Storing different types of tools and equipment used in the occupation **Theories:** The student should explain: • Possible workshop accidents and their causes and prevention • Methods of disposing of different types of wastes • Classification of wastes and their hazards • Importance of cleaning a workshop and surrounding • Purpose of each safety gear • Different safety signs and their		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						importance **Circumstantial knowledge:** **Detailed knowledge about:** • OSHA rules and regulations • Safe working practices • Waste disposal procedures • Workshop rules and regulations		
		(b) Maintaining workshop working environment	**ICT Based learning:** Guide the students through the use of video clips to explore maintaining the workshop working environment **Groups Discussion:** Organise the students in manageable groups to identify causes of accidents and their prevention in the workplace	**The student should be able to:** •Select relevant safety gears • Apply safety gears •Identify causes of health and safety hazards in a workshop and its surroundings •Take precautions against health and safety hazards •Maintain a safe working environment	Workshop-working environment maintained as per specification	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: •Maintain workshop safety •Dispose of different types of wastes •Clean workshop, tools, equipment and machines	The following tools and equipment should be made available: • Safety boots • Cleaning materials • Hoe • Broom • Brush • Dust covers • Dust bins • PPEs • Plain paper • Ruled paper	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				•Clean workshop surroundings •Store equipment and safety gears •Dispose of different types of wastes as per OHS		safely **Principles:** The student should explain the principles of: •Workshop cleaning •Storing different types of tools and equipment used in the occupation **Theories:** The student should explain: • •Possible workshop accidents and their causes and prevention • •Methods of disposing of different types of wastes • •Classification of wastes and their hazards • •Importance of cleaning a workshop and surrounding • •Purpose of	pens	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						each safety gear • •Different safety signs and their importance **Circumstantial knowledge:** **Detailed knowledge about:** •OSHA rules and regulations •Safe working practices • •Waste disposal procedures Workshop rules and regulations		
		(c) Maintaining personal safety	**Brainstorming:** Guide the students in a circle to explore various applications of personal safety **Demonstration:** Demonstrate to students how to wear safety gear **Practical Activity:** Organise the students in manageable groups to practise using safety gear correctly	**The student should be able to:** • Select relevant safety gears • Identify causes of health and safety hazards in a workshop and its surroundings • Take precautions against health and safety hazards • Interpret different safety signs in the workshop	Personal safety maintained as per safety rules and regulations	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Maintain workshop safety • Dispose different types of wastes • Clean workshop, tools, equipment, and	The following tools and equipment should be made available: • PPEs • Plain paper • Ruled paper • Pens • Hoe • Dust bin	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				• Draw safety signs • Maintain personal environment • Clean workshop, tools, equipment and workshop surroundings • Store tools, equipment and safety gears. • Apply safety gears • Dispose different types of wastes as per OHS		machines safely • Maintain personal safety while in workshop **Principles:** The student should explain the principles of: • Workshop cleaning • Storing different types of tools and equipment used in the occupation **Theories:** The student should explain: • Possible workshop accidents and their causes and prevention • Methods of disposing different types of wastes • Classification of wastes and their hazards		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						• Importance of cleaning a workshop and surrounding • Purpose of each safety gear • Different safety signs and their importance **Circumstantial knowledge** **Detailed knowledge about:** • OSHA rules and regulations • Safe working practices • Waste disposal procedures • Workshop rules and regulations		
	1.2 Handling accidents and incidents	(a) Handling Mechanical Hazards	**Brainstorming:** Guide the students through think-ink-pair-share to explain and relate various concepts of handling mechanical hazards	**The student should be able to:** • Carry out first aid to persons involved in accidents related to mechanical hazards	Handling Mechanical Hazards are maintained as per rules and regulations	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: •Identify	The following tools, equipment and safety gears are to be available: • Tool kit • motorcycle • mechanical equipment	31

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			ICT Based learning: Guide the students through the use of multimedia and simulation to visualise Handling Mechanical Hazards **Hands-on activity:** Organise the students in manageable groups to move around the motor vehicle mechanic's workshop to identify mechanical hazards	• Use the service manual • Interpret workshop rules and regulations • React correctly and safely when faced with an emergency • Identify and apply all emergency equipment and supplies • Locate first aid kit • Take necessary steps to save the victim • Report to superiors • Record accidents • Make periodic inspections of the workshop area and equipment • Identify hazardous material • Handle		mechanical hazards •Handle mechanical hazards •Use safety gears •Protect an unconscious victim •Carry out first aid •React correctly and safely when faced with an emergency. **Principles:** The student should explain the principles of: •Emergency life support **Theories:** The student should explain: •Effects of mechanical hazards •Treatment for an unconscious person •Importance of using safety gears •Advantages of accidents preventions •Usage of colour code and safety signs	• Air compressor • Fire extinguisher • Power Machines • Overalls • Rubber gloves • Gloves • Safety boots • Safety clear glasses • First aid kit • First aid poster • Helmet • Gloves • Earplug • Mask • overall • Safety boots • Gloves • Workshop rules and regulations guidelines • Service manual	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				hazardous material • Use colour code and know what colour represent • Handle mechanical hazards and equipment • Handle machines • Use safety gears • Clean tools, equipment, and workplace • Store tools and equipment		**Circumstantial Knowledge: Detailed knowledge about:** •Safety precautions while handling accidents and incidents •Safe handling of mechanical hazards •Waste disposal methods • Basic functions of the human body		
		(b) Handling Physical hazards	**Brainstorming:** Guide the students to brainstorm on the concepts of handling physical hazards **Practical work:** Guide the students on how to handle physical hazards and maintain workshop safety rules and regulations correctly **Practical activity:**	**The student should be able to:** •Carry out first aid to persons involved in accidents related to physical hazards •Use the service manual •Interpret workshop rules and regulations •React correctly and safely when faced with an emergency •Identify and apply all emergency	Physical hazards accidents and incidents handled according to workshop rules and regulations	**Knowledge evidence: Detailed knowledge of:** **Method used:** The student should explain how to: •Identify physical hazards •Handle physical hazards •Use safety gears •Protect an unconscious victim •Carry out first aid	The following tools, equipment and safety gears are to be available: •Tool kit •Motorcycle mechanical equipment •Air compressor •Fire extinguisher •Power machines •Overalls •Rubber gloves •Gloves •Safety boots	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Organise the students in manageable groups to perform mechanical hazards in the motor vehicle mechanic's workshop	equipment and supplies •Locate first aid kit •Take necessary steps to save the victim •Report to superiors •Record accidents •Make periodic inspections of the workshop area and equipment •Identify physical hazard •Handle physical hazard •Use colour code and know what each colour represents •Follow the compressed air rule •Follow good environmental practices •Handle machines •Use safety gears •Clean tools, equipment, and workplace • Store tools and equipment		•React correctly and safely when faced with an emergency **Principles:** The student should explain the principles of: •Emergency life support **Theories:** The student should explain: •Effects of physical hazards •Treatment for an unconscious person •Importance of using safety gears •Advantages of accidents preventions •Usage of colour code and safety signs **Circumstantial Knowledge: Detailed knowledge about:** •Safety precautions while handling accidents and	•Safety clear glasses •First aid kit •First aid poster •Helmet •Gloves •Ear plug •Mask •overall •Safety boots •Gloves •Workshop rules and regulations guidelines •Service manual	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						incidents •Safe handling of tools, equipment, and machines •Waste disposal meth Basic functions of the human body		
		(c) Handling chemical hazards	**Brainstorming:** Guide the students through brainstorming to describe different methods of handling chemical hazards **Practical work:** Guide the students on how to handle chemical materials in the Motor Vehicle Workshop using safety rules and regulations manual	**The student should be able to:** •Carry out first aid to persons involved in accidents related to chemical hazards •Use the service manual •Interpret workshop rules and regulations •React correctly and safely when faced with an emergency •Identify and apply all emergency equipment and supplies •Locate first aid kit •Take necessary steps to save the victim •Report to superiors •Record accidents •Make periodic inspections of	Chemicals accidents and incidents handled according to workshop rules and regulations	**Knowledge evidence:** **Detailed knowledge of:** **Method used**: The student should explain how to: •Identify hazard materials •Handle chemical hazards •Use safety gears •Protect an unconscious victim •Carry out first aid •React correctly and safely when faced with an emergency. **Principles:** The student should explain the principles of: •Emergency life	The following tools, equipment and safety gears are to be available: •Tool kit •Motorcycle mechanical equipment •Fire extinguisher •Overalls •Rubber gloves •Gloves •Safety boots •Safety clear glasses •First aid kit •First aid poster •Helmet •Gloves •Overall •Safety boots •Workshop rules and regulations guidelines • Service manual	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				workshop area and equipment •Identify chemical hazard •Handle chemical hazard •Use colour code and know what each colour represents •Follow good environmental practices •Handle chemicals •Use safety gears •Clean tools, equipment, and workplace • Store tools and equipment		support **Theories:** The student should explain: •Effects of chemical hazards •Treatment for unconscious person •Importance of using safety gears •Advantages of accidents preventions •Usage of colour code and safety signs **Circumstantial Knowledge: Detailed knowledge about:** •Safety precautions while handling accidents and incidents •Safe handling of chemical hazards •Waste disposal methods • Basic functions of the human body		
		(d) Handling	**Brainstorming:**	**The student should**	First aid offered	**Knowledge**	The following tools,	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
		electrical hazards	Guide the students to brainstorm on the concepts of handling electrical hazards **Practical work:** Guide students on how to handle electrical hazards **Practical activity:** Organise students in manageable groups to identify personal protective equipment (PPE) in the motor vehicle mechanic's workshop	**be able to:** • Select tools and equipment • Identify types of injuries. • Perform electrical hazards • Sterilise first aid tools. • Observe safety precautions • Store first aid kit	conforms to medical requirements	**evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to handle electrical hazards **Principles:** The student should explain the principles of handling electrical hazards • Handling electrical hazards **Theories:** The student should explain: - • Different types of electrical hazards • Types of electrical hazards • The use of accessories in a first aid kit • Importance of	equipment and safety gears are to be available: • Tool kit • motorcycle mechanical equipment • Air compressor • Fire extinguisher • Power Machines • Overalls • Rubber gloves • Gloves • Safety boots • Safety clear glasses • First aid kit • First aid poster • Helmet • Gloves • Ear plug • Mask • Overall • Safety boots • Gloves • Workshop rules and regulations guidelines • Service manual	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						first aid **Circumstantial knowledge** **Detailed knowledge about:** • Safety precautions to be observed while performing electrical hazards • Safe handling of first aid kit • Waste disposal		
		(e) Maintaining safety gears	**Brainstorming:** Guide students to brainstorm on the concepts of safety gears **Practical work:** Guide students to understand the available safety gears, and how are they used, stored, and maintained **Practical activity:** Organise students in	**The student should be able to:** •Select relevant safety gears •Take precautions against health and safety hazards •Interpret different safety signs in the workshop •Draw safety signs •Store equipment and safety gears •Apply safety gears •Dispose different	Safety gears maintained as per specification	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Identify safety gears • Use safety gears • React correctly and safely when faced	The following tools and equipment should be made available: • PPEs, • Plain paper • Ruled paper • Pens	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			manageable groups to identify personal protective equipment (PPE)	types of wastes as per OHS		with emergency **Principles:** The student should explain the principles of: Maintaining safety gears **Circumstantial knowledge: Detailed knowledge about:** • Safe handling of tools and equipment • Waste disposal methods		
	1.2 Handling fire accidents	(a) Handling firefighting equipment and materials	**Brainstorming:** Guide students through interactive simulation to visualize firefighting equipment and materials handling. **Practical work:** Guide the students on how firefighting equipment and	**The student should be able to:** • Select tools, equipment and safety gears • Identify common classes of fire • Use first aid kit • React correctly	Firefighting equipment and materials are handled as per rules and regulations	**Knowledge evidence: Detailed knowledge of:** **Method used**: The student should explain how to: • Identify different type of fire extinguisher	The following tools, equipment and safety gears are to be available: - • Firefighting rules and regulations • Workshop rules and regulations • Fire extinguishers	32

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			materials are available, used, stored and maintained. **Practical activity:** Organise the students in manageable groups to identify personal protective equipment (PPE)	and safely when faced with different types of fire • Apply the right class of fire extinguisher • Handle different types of fire • Apply the right class of firefighting materials • Check and test fire extinguishers • Clean up tools, equipment and working place • Store tools, equipment and safety gears		• Apply the right type of fire extinguishers •Apply right type of firefighting materials **Principles:** The student should explain the principles of: • Identifying different type of fire extinguishers • Checking and testing fire extinguishers • Applying right class of fire extinguishers **Theories:** The student should explain: • Importance of handling fire accidents • Types and common classes of fire • Handle different types of fire	• Firefighting materials • First aid kit • Gloves • Safety boots • Overall • Safety clear glasses	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						• Importance of checking and servicing fire extinguishers •Importance of differentiate firefighting materials **Circumstantial knowledge:** **Detailed knowledge about:** •Safety precautions while handling fire accidents •Safe handling of tools and equipment •Waste disposal methods		
		(b) Handling different types of fire	**Brainstorming:** Guide students through ICT learning approach to visualise various methods of fire handling **Practical work:** Guide students on the various methods for managing different types of fires	**The student should be able to:** • Select tools, equipment, and safety gears • Identify common classes of fire • Use first aid kit • React correctly and safely when faced with	Different types of fire are handled as per rules and regulations	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Identify different type of fire extinguisher	The following tools, equipment and safety gears are to be available: • Firefighting rules and regulations • Workshop rules and regulations • Fire extinguishers • Firefighting	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Practical activity: Organise students in manageable groups to identify personal protective equipment (PPE) in the motor vehicle mechanic's workshop	different types of fire • Apply the right class of fire extinguisher • Handle different types of fire • Apply the right class of firefighting materials • Check and test fire extinguishers • Clean up tools, equipment, and working place • Store tools, equipment, and safety gears		• Apply the right type of fire extinguishers • Apply right type of firefighting materials **Principles:** The student should explain the principles of: • Identifying different type of fire extinguishers • Checking and testing fire extinguishers • Applying right class of fire extinguishers **Theories:** The student should explain: • Importance of handling fire accidents • Types and common classes of fire • Handle different types of fire • Importance of	materials • First aid kit • Gloves • Safety boots • Overall Safety clear glasses	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						handling and fire extinguishers **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while handling fire accidents • Safe handling of tools and equipment • Waste disposal methods		
	1.3 Performing first Aid	(a) Performing artificial respiration	**Brainstorming:** Guide students through ICT learning approach to visualise various ways of performing artificial respiration **Practical work:** Guide students on various methods of performing artificial respiration **Practical activity:**	**The student should be able to:** • Select tools and equipment • Identify types of injuries • Perform artificial respiration • Attend minor wounds • Sterilise first aid tools • Observe safety	First aid offered conforms to medical requirements	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to perform artificial respiration **Principles:** The student should explain the principles of:	The following tools, equipment and safety gears are to be available: • Video clips, TV and multimedia • First aid Kit • Stretcher • Light blanket • Sterilizer • Towel • Overall • Medical gloves	33

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Organise students in manageable groups to identify personal protective equipment (PPE) in the motor vehicle mechanic's workshop	precautions • Store first aid kit		• Performing artificial respiration **Theories:** The student should explain • Types of artificial respiration • The use of accessories in a first aid kit **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions to be observed while performing artificial respiration • Waste disposal	• Safety boots	
		(b) Performing first aid on minor scalpel wounds/injuries	**Brainstorming**: Guide students in manageable groups through a discussion to explore various ways of performing first aid on minor scalpel	**The student should be able to:** • Select tools and equipment • Identify types of injuries	The first aid provided meets medical standards	**Knowledge evidence:** **Detailed knowledge of:** **The method used:** The student should explain how to	The following tools, equipment, and safety gear should be available: • First aid Kit • Stretcher	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			wounds/injuries **Practical Work**: Guide students in manageable groups through hands-on activities to familiarise them with the concepts of performing first aid on minor scalpel wound/injuries **Practical activity:** Guide students through class activities to elucidate the concepts and principles of performing first aid on minor scalpel wounds or injuries.	• Perform first aid on minor scalpel wound • Sterilise first aid tools • Observe safety precautions • Store first aid kit		perform first aid on minor scalpel wounds **Principles:** The student should explain the principles of: • Performing first aid on minor scalpel wounds or injuries • Attending minor wounds **Theories:** The student should explain: • Different types first aid on minor scalpel wounds • Different types of accidents • Types of artificial respiration • The use of accessories in a first aid kit • Importance of first aid	• Light blanket • Sterilizer • Towel • Overall • Medical gloves • Safety boots	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						Circumstantial knowledge: **Detailed knowledge about:** • Safety precautions to be observed while performing first aid • Safe handling of first aid kit • Waste disposal		
2.0 Preforming bench works	2.1 Performing cutting	(a) Performing straight sawing	**Brainstorming:** Guide students in small groups to use knowledge and skills to perform straight sawing **Practical work:** Guide student on the various methods for performing straight sawing **Practical activity:** Organise students in manageable groups to identify and perform straight sawing in the motor vehicle	**The student should be able to**: •Interpret drawings •Select tools and equipment •Take measurements •Cut workpiece •Check for accuracy •Observe safety precautions •Clean tools, workpiece, and work place •Store tools, equipment, and workplace	Pieces of material cut as per technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to cut workpiece in different sizes **Principles:** The student should explain the principles of: • Taking measurements • Marking workpiece • Cutting	The following tools, equipment and safety gears are to be available: • Work bench • Steel ruler • Scriber • T-Square • Vernier calliper • Divider • Micrometre • Mallet • Surface table/plate • Ball peen hammer • Anvil • Vernier height	66

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			mechanic's workshop			process. **Theories:** The student should explain: • Different types of materials and their properties • Application of different straight sawing • Uses of sawing tools and equipment • Use of measuring tools **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while performing sawing process • Safe handling of work tools and equipment • Waste disposal.	gauge • Chisels • File • Hand shear • Shearing machine • Centre punch • Hacksaw • Safety clear glasses • Gloves • Safety boots • Overall	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
		(b) Performing angular sawing	**Brainstorming:** Guide students to brainstorm the different types of angular sawing **Demonstration:** Guide students to demonstrate different ways of performing angular sawing using soft materials **Practical work:** Guide students to practise angular sawing using operation sheet in motor vehicle workshop	**The student should be able to**: •Interpret drawings •Select tools and equipment •Take measurements •Cut workpiece •Check for accuracy •Observe safety precautions •Clean tools, workpiece, and work place •Store tools, equipment, and workplace	Pieces of material cut as per technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to cut workpiece in different sizes **Principles:** The student should explain the principles of: • Taking measurements • Marking workpiece • Cutting process **Theories:** The student should explain: • Different types of materials and their properties • Application of different straight sawing • Uses of sawing tools and	The following tools, equipment and safety gears are to be available: • Work bench • Steel rule • Scriber • T-Square • Vernier calliper • Divider • Micrometre. • Mallet • Surface table/plate • Ball peen hammer • Anvil • Vernier height gauge • Chisels • File • Hand shear • Shearing machine • Centre punch • Hacksaw • Safety clear glasses • Gloves • Safety boots	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						equipment • Use of measuring tools **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while performing sawing process • Safe handling of work tools and equipment • Waste disposal	• Overall	
		(c) Performing chiselling	**ICT-based learning approach:** Guide students through ICT learning approach to perform chiselling **Demonstration:** Guide students to demonstrate different ways of performing chiselling using soft materials **Hands-on activities:**	**The student should be able to**: •Interpret drawings •Select tools and equipment •Take measurements •Cut workpiece •Check for accuracy •Observe safety precautions •Clean tools, workpiece and work place. •Store tools, equipment and	Pieces of material cut and shaped as per technical specifications	**Knowledge evidence:** **Detailed knowledge of**: **Method used:** The student should explain how to perform chiselling in different sizes and shapes **Principles**: The student should explain the principles of: • Taking	The following tools, equipment and safety gears are to be available: •Flat Chisels Video, TV, Multimedia •Point Chisels •Bullnose Chisels •Hammers •Mallets •Ball Peen Hammers •Files and Rasps •Clamps •Rulers	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Guide students in manageable groups through hands-on activities to demonstrate different types of chiselling	workplace		measurements • Marking workpiece •Chiselling process **Theories**: The student should explain: • Different types of materials and their properties • Application of different chisel • Uses of chisel tools, equipment and materials • Use of measuring tools **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while performing chiselling process • Safe handling of work tools and equipment • Waste disposal	•Callipers Safety Gear •Safety Glasses •Gloves •Workbench •Vice •Dust Extraction System •Materials •Stone •Wood •Metal •Plaster or Concrete	
	2.2 Performing	(a) Performin	**Demonstration:** Guide	The student should	Filed/ground	**Knowledge**	The following tools,	66

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
	filing	g flat filing	students to demonstrate the use of different files to perform filing **Interactive simulation:** Guide students through interactive simulation to visualise and perform different types of flat filing **Hands-on activities:** Guide students in manageable groups through hands-on activities to perform flat filing	be able to: •Interpret drawings •Select tools and equipment •Take measurements and marking •File workpiece •Grind workpiece •Check for accuracy •Observe safety precautions •Clean tools, workpiece and work place •Store tools, equipment, and workpiece	workpiece conforms to technical specifications	**evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Mark workpiece • File workpiece **Principles:** The student should explain the principles of: • Taking measurements • Marking workpiece • Filing workpiece **Theories:** The student should: • Identify different types of materials and their properties • Explain	equipment and safety gears are to be available: • Work bench • Set of files • File card Video clips • Try square • Steel rule • Centre punch • Scriber • Grinder • Divider • Hacksaw • Overall • Gloves • Safety clear glasses • Safety boots	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						applications of different materials • Describe proper use of files and equipment **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions pertaining to filling • Safe handling of work tools and equipment • Waste disposal		
		(b) Performing radii filing	**Demonstration:** Guide students to demonstrate the use of radii filing as per workshop instructions **Practical work:** Guide students to perform radii filing as per instructions in the	**The student should be able to:** •Interpret drawings •Select tools and equipment •Take measurements and marking •File workpiece •Grind workpiece •Check for accuracy	Filed/ground workpiece conforms to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Mark	The following tools, equipment and safety gears are to be available: • Work bench • Set of files • File card • Try square • Steel rule • Centre punch	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			motor vehicle mechanic's workshop	•Observe safety precautions •Clean tools, workpiece and work place •Store tools, equipment, and workpiece		workpiece • File workpiece **Principles:** The student should explain the principles of: • Taking measurements • Marking workpiece • Filing workpiece **Theories:** The student should: • Identify different types of materials and their properties • Explain applications of different materials • Describe proper use of files and equipment **Circumstantial knowledge:**	• Scriber • Grinder • Chisel • Divider • Hacksaw • Overall • Gloves • Safety clear glasses • Safety boots	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						Detailed knowledge about: • Safety precautions pertaining to filling • Safe handling of work tools and equipment • Waste disposal		
		(c) Performing angle filing	**Brainstorming:** Guide students to define angle filing and identify types of angle filing **Practical work:** Guide students to perform different angle filing **Practical activity:** Organise students in manageable groups to perform angle filing in the motor vehicle mechanic's workshop	**The student should be able to:** •Interpret drawings •Select tools and equipment •Take measurements and marking •File workpiece •Grind workpiece •Check for accuracy •Observe safety precautions •Clean tools, workpiece, and work place •Store tools, equipment and workpiece	Filed/ground workpiece conforms to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Mark workpiece • File workpiece **Principles:** The student should explain the principles of: • Taking	The following tools, equipment and safety gears are to be available: • Work bench • Set of files • File card • Try square • Steel rule • Centre punch • Scriber • Grinder • Chisel • Divider • Hacksaw • Overall • Gloves • Safety clear glasses	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						measurements • Marking workpiece • Filing workpiece **Theories:** The student should: • Identify different types of materials and their properties • Explain applications of different materials • Describe proper use of files and equipment **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions pertaining to filling • Safe handling of work tools and equipment • Waste disposal	• Safety boots	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
	2.3 Performing drilling	(a) Performing hand drilling on plate	**Interactive simulation:** Guide students through interactive simulation to develop an understanding of performing hand drilling on a plate **Problem-based approach**: Guide students to connect hand drilling on a plate to real-life applications in motor vehicle mechanics **Hands-on activities:** Guide students in small groups through hands-on activities to perform drilling on a plate in the motor vehicle mechanics' workshop	**The student should be able to:** •Interpret drawings •Select tools, equipment, and materials •Mark workpiece •Cut workpiece to size •Perform drilling •Perform reaming •Observe safety precautions •Clean tools, equipment, and work place •Store tools, equipment and workpiece.	Drilled hole conforms to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Perform drilling process • Perform reaming • Calculate drill size and drilling speed **Principles:** The student should explain the principles of: • Drilling • Selecting of drilling speed **Theories:** The student should explain: • Drilling procedure • Importance of coolant in drilling	The following tools, equipment and safety gears are to be available: • Work bench • Video clips • Hand drilling • Power pint machine • Centre punch • Hammer (Ball peen hammer) • Scriber • Steel rule • Try square • Set of drill bits • Bench drilling machine and accessories • Power hacksaw • Hacksaw • Oil can • Wire brush • Vernier calliper • Calculator • Reamers • Safety clear glasses • Gloves • Goggles	66

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						process • Materials used to manufacture drill bits • Drill bit cutting angles **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while performing the task • Safe handling of tools and equipment • Waste disposal	• Safety boots • Overalls	
		(b) Performing drilling on a bench drilling machine	**Think-ink-pair-share:** Guide students through the think-ink-pair-share process to relate different measuring techniques used in bench work and bench drilling **Group discussion:** Organise students in small groups to	**The student should be able to:** • Interpret drawings • Select tools, equipment, and materials • Mark workpiece • Cut workpiece to size • Perform drilling	Drilled hole conforms to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Perform drilling process • Calculate drill	The following tools, equipment and safety gears are to be available: • Work bench • Hand drilling machine • Centre punch • Hammer (Ball peen hammer) • Scriber	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			describe bench drilling machine **Hands-on activities:** Guide students in small groups to use knowledge and skills of motor vehicle mechanics through hands-on activities to perform drilling on a bench drilling machine	machine • Observe safety precautions • Clean tools, equipment, and work place • Store tools, equipment, and workpiece		size and drilling speed **Principles:** The student should explain the principles of: • Drilling • Selecting drilling speed **Theories:** The student should explain: • Drilling procedure • Importance of coolant in drilling process • Materials used to manufacture drill bits • Drilling on a bench drilling machine **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while	• Steel rule • Try square • Set of drill bits • Bench drilling machine and accessories • Power hacksaw • Hacksaw • Oil can • Wire brush • Vernier calliper • Calculator • Reamers • Safety clear glasses • Gloves • Goggles • Safety boots • Overalls	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						performing the task • Safe handling of tools and equipment • Waste disposal		
		(c) Counter boring drilled holes	**Brainstorming:** Guide students: to define counterboring and identify different types of counterboring **Practical activity:** Guide students to perform counterboring on a drilled hole **Practical activity:** Organise students in manageable groups to identify and demonstrate how to perform counterboring on drilled holes in the motor vehicle mechanic's workshop	**The student should be able to:** •Interpret drawings •Select tools, equipment, and materials •Mark workpiece •Counterboring on drilled holes •Perform drilling •Observe safety precautions •Clean tools, equipment, and work place •Store tools, equipment, and workpiece	Drilled hole conforms to technical specifications	**Knowledge evidence:** **Detailed knowledge of**: **Method used:** The student should explain how to: • Perform counterboring on drilled holes • Calculate bore size and drilling speed **Principles**: The student should explain the principles of: • Counterboring on drilled holes • Selecting drilling speed **Theories**: The student should describe:	The following tools, equipment and safety gears are to be available: • Work bench • Hand drilling machine • Centre punch • Hammer (Ball peen hammer) • Scriber • Steel rule • Try square • Set of drill bits • Bench drilling machine and accessories • Power hacksaw • Hacksaw • Oil can • Wire brush • Vernier calliper • Calculator • Reamers	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						• Boring procedure • Importance of coolant in drilling process • Materials used to manufacture drill bits • Counterboring on drilled holes **Circumstantial knowledge**: **Detailed knowledge about:** • Safety precautions while performing the task • Safe handling of tools and equipment • Waste disposal	• Safety clear glasses • Gloves • Goggles • Safety boots • Overalls	
	2.4 Performing riveting	(a) Performing manual riveting	**Brainstorming:** Guide students to brainstorm manual riveting machine and identify different types of manual riveting **Practical work:** Guide students on the	**The student should be able to:** •Interpret drawings •Select tools, equipment, and materials •Mark workpiece •Cut workpieces •Drill holes	Riveted pieces conform to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Mark workpieces	The following tools, equipment and safety gears are to be available: •Rivet sets •Riveting machine and accessories •Steel rule •Wire brush	66

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			various methods for performing different types of manual riveting **Practical activity:** Organise students in manageable groups to identify and demonstrate how to perform manual riveting in the motor vehicle mechanic's workshop	•Perform riveting •Observe safety precautions •Clean tools, equipment, workpiece, and work place •Store tools and equipment		• Rivet pieces in different sizes **Principles:** The student should explain the principles of: • Taking measurements • Marking workpiece • Riveting pieces of metals **Theories:** The student should explain: • Types of joints • Types of rivets • Application of different materials in riveting • Use of cutting tools and equipment **Circumstantial knowledge: Detailed knowledge about:** • Safety	•T-Square •Centre punch •Drilling machine •Set of drill bits •Rivet gun •Divider •Soft hammer •Ball peen hammer •Revert head •Anvil •Work bench •Pliers •Vice grip •Hacksaw •Helmet •Goggles •Gloves •Safety boot •Overall	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						precautions while performing the task • Safe handling of work tools, equipment, and workpieces • Waste disposal		
		(b) Performing pop riveting	**Brainstorming:** Guide students to brainstorm pop rivet, identify different types of pop rivet **Practical work:** Guide students on the various methods for performing pop riveting **Practical activity:** Organise students in manageable groups to identify and demonstrate how to perform pop riveting in the motor vehicle mechanic's workshop	**The student should be able to:** •Interpret drawings •Select tools, equipment, and materials •Mark workpiece •Cut workpieces •Drill holes •Perform pop riveting •Observe safety precautions •Clean tools, equipment, workpiece and work place •Store tools, equipment, and workpieces	Riveted pieces conform to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Mark workpieces • Rivet pieces in different sizes **Principles:** The student should explain the principles of: • Taking measurements. • Marking workpiece • Riveting pieces of metals	The following tools, equipment and safety gears are to be available: •Rivet sets •Riveting machine and accessories •Steel rule •Wire brush •T-Square •Centre punch •Drilling machine •Set of drill bits •Pop rivet gun •Divider •Soft hammer. •Ball peen hammer •Revert head •Anvil •Work bench •Pliers	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						Theories: The student should explain: • Types of joints • Types of rivets • Application of different materials in riveting • Use of cutting tools and equipment **Circumstantial knowledge: Detailed knowledge about:** • Safety precautions while performing the task • Safe handling of work tools, equipment, and workpieces • Waste disposal	•Vice grip •Hacksaw •Helmet •Goggles •Gloves •Safety boot •Overall	
		(c) Performing pneumatic	**Brainstorming:** Guide students to brain	**The student should be able to:**	Riveted pieces conform to	**Knowledge evidence:**	The following tools, equipment and safety	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
		riveting	storm pneumatic rivet and identify different types of pneumatic rivet **Practical work:** Guide students on the various methods for performing different types of pneumatic riveting **Practical activity:** Organise students in manageable groups to identify and demonstrate how to perform pneumatic riveting in the motor vehicle mechanic's workshop	• Interpret drawings • Select tools, equipment, and materials • Mark workpiece • Cut workpieces • Drill holes • Perform pneumatic riveting • Observe safety precautions • Clean tools, equipment, and workpiece • Store tools, equipment, and workpiece • Clean work place	technical specifications	**Detailed knowledge of:** **Method used:** The student should explain how to: • Mark workpieces • Rivet pieces in different sizes **Principles:** The student should explain the principles of: • Taking measurements • Marking workpiece • Riveting pieces of metals **Theories:** The student should explain: • Types of joints • Types of rivets • Application of different materials in riveting • Use of cutting tools and	gears are to be available: • Rivet sets • Riveting machine and accessories • Steel rule • Wire brush • T-Square • Centre punch • Drilling machine • Set of drill bits • Pop rivet gun • Piece of wood • Chisel • Divider • Shearing machine • Soft hammer • Ball peen hammer • Air compressor • Revert head forming tools • Data book • Anvil • Work bench • Pliers • Vice grip • Hacksaw • Helmet	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						equipment **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while performing the task • Safe handling of work tools, equipment, and workpieces • Waste disposal	• Goggles • Gloves • Safety boot • Overall	
	2.5 Performing threading	(a) Carrying out dieing cutting	**Brainstorming:** Guide students to brainstorm die cutting, identify different types of die cutting. **Practical work:** Guide students on the various methods for performing of die cutting **Practical activity:**	**The student should be able to:** •Interpret drawings •Select tools, equipment, and materials •Mark workpiece •Drill hole •Cut threads •Observe safety precautions •Clean tools, equipment, and	Cut threads conform to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Cut external threads • Cut internal threads **Principles:** The	The following tools, equipment and safety gears are to be available: • Set of taps and stock wrenches • Set of dies and stock wrenches • Work bench • Bench vice • Wire brush • Set of drill bits	66

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Organise students in manageable groups to identify and demonstrate how to perform die cutting in the motor vehicle mechanic's workshop	workpiece •Store tools, Equipment, and workpiece. •Clean work place		student should explain the principles of: • Taking measurements • Selecting thread pitch • Calculating hole diameter **Theories:** The student should explain: • The function of taps and dies • Types of taps and dies • Thread classifications **Circumstantial knowledge: Detailed knowledge about:** • Safety precautions while cutting threads • Safe handling of tools,	• Oil can • Scriber • Steel rule • Micrometres • Drilling machine • Hacksaw • Thread gauges • Vernier calliper • File • Centre drill • Centre punch • Thread data manual • Gloves • Goggles • Safety boots • Overalls	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						equipment, and materials • Waste disposal		
		(b) Carrying out tapping	**Brainstorming:** Guide students to brain storm a tap, and identify different types of taps **Practical work:** Guide students on the various methods for performing tapping **Practical activity:** Organise students in manageable groups to identify and demonstrate how to perform tapping in the motor vehicle mechanic's workshop	**The student should be able to:** •Interpret drawings •Select tools, equipment, and materials •Mark workpiece •Drill hole •Cut threads •Observe safety precautions •Clean tools, equipment, and workpiece •Store tools, Equipment, and workpiece •Clean work place	Cut threads conform to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Cut external threads • Cut internal threads **Principles:** The student should explain the principles of: • Taking measurements • Selecting thread pitch • Calculating hole diameter **Theories:** The student should explain: • The function of taps and	The following tools, equipment and safety gears are to be available: • Set of taps and stock wrenches • Set of dies and stock wrenches • Work bench • Bench vice • Wire brush • Set of drill bits • Oil can • Scriber • Steel rule • Micrometres • Drilling machine • Hacksaw • Thread gauges • Vernier calliper • File • Centre drill • Centre punch • Thread data manual • Gloves • Goggles	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						dies • Types of taps and dies • Thread classifications **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while cutting threads • Safe handling of tools, equipment, and materials • Waste disposal	• Safety boots • Overalls	
	2.6 Performing metal forming	(a) Bending flat materials	**Brainstorming:** Guide students to brainstorm bend and identify different types of bend **Practical work:** Guide students on the various methods for bending	**The student should be able to:** • Interpret drawing • Select tools, equipment, and workpiece • Mark workpiece • Clamp workpiece on bench vice	Workpiece formed conforms to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Form workpieces in different	The following tools, equipment and safety gears are to be available: • Work bench • Bench vice • Try square • Vernier calliper • Steel rule • Hacksaw	103

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Practical activity: Organise students in manageable groups to identify and demonstrate how to perform bending on flat materials in the motor vehicle mechanic's workshop	• Bend workpiece • Observe safety precautions • Clean tools, equipment, workpieces, and work place • Store tools, equipment, and remained material		shapes • Take measurements **Principles:** The student should explain the principles of: • Holding workpiece • Bending process • Making allowances for joints **Theories:** The student should explain: • Types of machines and equipment used for bending flat materials • Calculations required for bending flat materials • Uses of various tools and equipment • How to read	• Level protractor • Spring divider • Scriber • Anvil • Centre punch • Hammer • Radius gauges • Bending machine • Leather gloves • Overall • Safety boots • Safety glasses	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						scales **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while bending flat materials • Safe handling of tools and equipment • Waste disposal		
		(b) Bending round materials	**Brainstorming:** Guide students to brainstorm bend and identify types of bend **Practical work:** Guide students on the various methods for bending **Practical activity:** Organise students in manageable groups to identify and demonstrate how to perform bending of round materials in the motor vehicle	**The student should be able to:** • Interpret drawing • Select tools, equipment, and workpiece • Mark workpiece • Clamp workpiece on bench vice • Bend workpiece • Observe safety precautions • Clean tools, equipment, workpieces, and work place	Workpiece formed conforms to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Form workpieces in different shapes • Take measurements **Principles:** The student should explain the principles of:	The following tools, equipment and safety gears are to be available: •Work bench •Bench vice •Try square •Vernier calliper •Steel rule •Hacksaw •Level protractor •Spring divider •Scriber •Anvil •Centre punch •Hammer •Radius gauges •Bending machine	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			mechanic's workshop	• Store tools, equipment, and remained material		• Holding workpiece • Bending process • Making allowances for joints **Theories:** The student should explain: • Types of machines and equipment used for bending round materials • Calculations required • Uses of various tools and equipment • How to read scales **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while bending round	•Leather gloves •Overall •Safety boots •Safety glasses	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						materials • Safe handling of tools and equipment • Waste disposal		
3.0 Performing welding and fabrication	3.1 Performing arc welding	(a) Performing hand arc welding bead	**Brainstorming:** Guide students to brainstorm arc welding and identify different types of arc welding **Practical work:** Guide students on various methods for performing arc welding **Practical activity:** Organise students in manageable groups to identify and demonstrate how to perform arc welding in the motor vehicle mechanic's workshop	**The student should be able to:** • Interpret drawings • Select tools, equipment, and materials • Mark workpiece • Cut workpiece • Select welding current • Weld workpiece • Remove slag • Observe safety precautions • Clean tools, equipment, workpiece, and work place • Store tools and equipment	Welded workpiece conforms to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Prepare workpiece • Weld different types of joints and sizes **Principles:** The student should explain the principles of: • Taking measurements • Welding process **Theories:** The student should explain: • Types of welding	The following tools, equipment and safety gears are to be available: • AC/DC arc welding machine • Chipping hammer • Welding bench • Clamp • Hand hacksaw • Shearing machine • Wire brush • Scriber • Centre punch • Steel rule • Ball peen hammer • Set of files • Try square • Grinding machine • Anvil • Welding shield	109

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						• Types of electrodes • Properties of materials • Application of AC and DC arc welding machines **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while performing arc welding • Safe handling of work tools, equipment and materials • Waste disposal	• Leather apron • Tong • Power hacksaw • Gloves • Safety boots • Overall • Safety clear glasses	
		(b) Performing hand V joint	**Brainstorming:** Guide students to define hand V joint and identify different types of hand V joints **Practical work:** Guide students on how	**The student should be able to:** • Interpret drawings • Select tools, equipment, and materials • Mark workpiece	Welded workpiece conforms to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Prepare	The following tools, equipment and safety gears are to be available: • AC/DC arc welding machine • Chipping hammer	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			to perform hand V joints. **Practical activity:** Organise the students in manageable groups to identify and demonstrate how to perform hand V joint in the motor vehicle mechanic's workshop	• Cut workpiece • Select welding current • Weld workpiece • Remove slag • Observe safety precautions • Clean tools, equipment, workpiece, and work place • Store tools and equipment		workpiece • Weld different types of joints and sizes **Principles:** The student should explain the principles of: • Taking measurements • Welding process **Theories:** The student should explain: • Types of hand V joint • Types of electrodes • Properties of materials • Application of AC and DC arc welding machines **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions	• Welding bench • Clamp • Hand hacksaw • Shearing machine • Wire brush • Scriber • Centre punch • Steel rule • Ball peen hammer • Set of files • Try square • Grinding machine • Anvil • Welding shield • Leather apron • Tong • Power hacksaw • Gloves • Safety boots • Overall • Safety clear glasses	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						while performing hand V joint • Safe handling of work tools, equipment, and materials • Waste disposal		
		(c) Performing hand butt joint	**Brainstorming:** Guide students to define hand butt joint and identify different types of hand butt joints **Practical work:** Guide students on the various methods for performing hand butt joints **Practical activity:** Organise students in manageable groups to identify and demonstrate how to perform hand butt joint in the motor vehicle mechanic's workshop	**The student should be able to:** • Interpret drawings • Select tools, equipment and materials • Mark workpiece • Cut or grind workpiece • Select welding current • Weld workpiece • Remove slag • Observe safety precautions • Clean tools, equipment, workpiece, and work place • Store tools and equipment	Welded workpiece conforms to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: •Prepare workpiece •Weld different types of joints and sizes **Principles**: The student should explain the principles of: •Taking measurements •Welding process **Theories**: The student should explain: •Types of welding •Types of electrodes	The following tools, equipment and safety gears are to be available: • AC/DC arc welding machine • Chipping hammer • Welding bench • Clamp • Hand hacksaw • Shearing machine • Wire brush • Scriber • Centre punch • Steel rule • Ball peen hammer • Set of files • Try square • Grinding machine	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						•Properties of materials •Application of AC and DC arc welding machines **Circumstantial knowledge:** **Detailed knowledge about:** •Safety precautions while performing arc welding •Safe handling of work tools, equipment, and materials •Waste disposal	• Anvil • Welding shield • Leather apron • Tong • Power hacksaw • Gloves • Safety boots • Overall • Safety clear glasses	
		(d) Performing hand tee joint welding	**Brainstorming:** Guide students to define tee joint welding and identify different types of hand butt joints **Practical work:** Guide students on how to perform different types of tee joint welding **Practical activity:** Organise students in	**The student should be able to:** • Interpret drawings • Select tools, equipment and materials • Mark workpiece • Cut or grind workpiece • Select welding current • Weld workpiece	Welded workpiece conforms to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: •Prepare workpiece •Weld different types of joints and sizes **Principles**: The student should explain the	The following tools, equipment and safety gears are to be available: • AC/DC arc welding machine • Chipping hammer • Welding bench • Clamp • Hand hacksaw • Shearing machine	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			manageable groups to identify and demonstrate how to perform tee joint welding in the motor vehicle mechanic's workshop	• Remove slag • Observe safety precautions • Clean tools, equipment, workpiece, and work place • Store tools and equipment		principles of: •Taking measurements •Welding process **Theories**: The student should explain: •Types of welding •Types of electrodes •Properties of materials •Application of AC and DC arc welding machines **Circumstantial knowledge:** **Detailed knowledge about:** •Safety precautions while performing hand tee joint •Safe handling of work tools, equipment, and materials •Waste disposal	• Wire brush • Scriber • Centre punch • Steel rule • Ball peen hammer • Set of files • Try square • Grinding machine • Anvil • Welding shield • Leather apron • Tong • Power hacksaw • Gloves • Safety boots • Overall • Safety clear glasses	
	3.2 Performing gas welding	(a) Using gas welding tools and equipment	**Brainstorming:** Guide students to define gas welding and identify different types	**The student should be able to:** • Interpret drawings	Welded workpiece conforms to technical	**Knowledge evidence:** **Detailed knowledge of:**	The following tools, equipment and safety gears are to be available:	144

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			of gas welding **Practical work:** Guide students on how to perform different types of gas welding **Practical activity:** Organise students in manageable groups to identify and demonstrate how to perform gas welding in the motor vehicle mechanic's workshop	• Select tools, equipment, and materials • Take measurements • Prepare welding joints • Adjust the welding flame • Carry out gas welding • Observe safety precautions • Clean tools, equipment, workpiece, and work place • Store tools and equipment	specifications	**Method used:** The student should explain how to: • Mark workpiece • Cut workpieces • Adjust gas welding flame • Weld different workpieces • Check welded joint **Principles:** The student should explain the principles of gas welding **Theories:** The student should explain: • Importance of gas welding • Types of gas welded materials • Use of tools and gas welding equipment	• Oxy-acetylene gas cylinders and accessories • Hammer • Pair of tongs • Wire brush • Chisel • Shearing machine • Oxy-acetylene welding bench • Oxy-acetylene welding bay • Clamp • Hacksaw • Scriber • Steel rule • Grinding machine • Cylinder trolley • Helmet • Safety boots • Overall • Gloves • Leather apron • Gas welding goggles	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						• Properties of oxygen and acetylene gas • Types of gas welded joints **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while performing gas welding • Safe handling of work tools, equipment, and workpieces • Waste disposal		
		(b) Performing hand butt joint	**Brainstorming:** Guide students to define hand butt joint and identify different types of hand butt joints **Practical work:** Direct students on the various methods for performing hand butt joints	**The student should be able to:** • Interpret drawings • Select tools, equipment, and materials • Take measurements • Prepare welding joints	Welded workpiece conforms to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Mark workpiece • Cut workpieces	The following tools, equipment and safety gears are to be available: • Oxy-acetylene gas cylinders and accessories • Hammer • Pair of tongs • Wire brush • Chisel	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Practical activity: Organise students in manageable groups to identify and demonstrate how to perform hand butt joint in the motor vehicle mechanic's workshop	• Adjust the welding flame • Carry out gas welding • Observe safety precautions • Clean tools, equipment, workpiece and work place • Store tools and equipment		• Adjust gas welding flame • Weld different workpieces • Check welded joint **Principles:** The student should explain the principles of hand butt joint **Theories:** The student should explain: • Importance of gas welding • Types of gas welded materials • Use of tools and gas welding equipment • Properties of oxygen and acetylene gas • Types of gas welded joints **Circumstantial knowledge:**	• Shearing machine • Oxy-acetylene welding bench • Oxy-acetylene welding bay • Clamp • Hacksaw • Scriber • Steel rule • Grinding machine • Cylinder trolley • Helmet • Safety boots • Overall • Gloves • Leather apron. • Gas welding goggles	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						Detailed knowledge about: • Safety precautions while performing hand butt joint • Safe handling of work tools, equipment, and workpieces • Waste disposal		
		(c) Performing hand lap joint	**Brainstorming:** Guide students to define hand lap joint and identify different types of hand lap joints **Practical work:** Guide students on the methods for performing different types of hand lap joints **Practical activity:** Organise students in manageable groups to identify and demonstrate how to perform hand lap joint in the motor vehicle	**The student should be able to:** • Interpret drawings • Select tools, equipment, and materials • Take measurements • Prepare welding joints • Adjust the welding flame • Carry out gas welding • Observe safety precautions • Clean tools,	Welded workpiece conforms to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Mark workpiece • Cut workpieces • Adjust gas welding flame • Weld different workpieces • Check welded joint **Principles:** The	The following tools, equipment and safety gears are to be available: • Oxy-acetylene gas cylinders and accessories • Hammer • Pair of tongs • Wire brush • Chisel • Shearing machine • Oxy-acetylene welding bench • Oxy-acetylene welding bay • Clamp	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			mechanic's workshop	equipment, workpiece, and work place • Store tools and equipment		student should explain the principles of hand butt joint **Theories:** The student should explain: • Importance of gas welding • Types of gas welded materials • Use of tools and gas welding equipment • Properties of oxygen and acetylene gas • Types of gas welded joints **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while performing hand butt joint	• Hacksaw • Scriber • Steel rule • Grinding machine • Cylinder trolley • Helmet • Safety boots • Overall • Gloves • Leather apron • Gas welding goggles	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						• Safe handling of work tools, equipment, and workpieces • Waste disposal		
		(d) Performing brazing	**Brainstorming:** Guide students to define brazing and identify different types of brazing methods **Practical work:** Guide students on the various methods for performing brazing **Practical activity:** Organise students in manageable groups to identify and demonstrate how to perform brazing in the motor vehicle mechanic's workshop	**The student should be able to:** • Interpret drawings • Select tools, equipment, and materials • Take measurements • Prepare welding joints • Adjust the welding flame • Carry out brazing • Observe safety precautions • Clean tools, equipment, workpiece and work place • Store tools and equipment	Welded workpiece conforms to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Mark workpiece • Cut workpieces • Adjust gas welding flame • Weld different workpieces • Check brazed joint **Principles:** The student should explain the principles of brazing **Theories:** The student should explain:	The following tools, equipment and safety gears are to be available: • Oxy-acetylene gas cylinders and accessories • Hammer • Pair of tongs • Wire brush • Chisel • Shearing machine • Oxy-acetylene welding bench • Oxy-acetylene welding bay • Clamp • Hacksaw • Scriber • Steel rule • Grinding machine • Cylinder trolley • Helmet	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						• The importance of brazing • Types of gas welded materials • Use of tools and gas welding equipment • Properties of oxygen and acetylene gas • Types of gas welded joints **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while performing brazing • Safe handling of work tools, equipment, and workpieces • Waste disposal	• Safety boots • Overall • Gloves • Leather apron • Gas welding goggles	
	3.3 Performing	(a) Carrying out	**Brainstorming:**	**The student should**	Soldered joint	**Knowledge**	The following tools,	45

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
	soldering	thin metal soldering	Guide students to define thin metal soldering and identify different techniques of thin metal soldering **Practical work:** Guide students on how to perform different techniques of thin metal soldering **Practical activity:** Organise students in manageable groups to identify and demonstrate how to perform thin metal soldering in the motor vehicle mechanic's workshop	**be able to:** • Select tools, equipment, and material • Prepare parts to be soldered • Carry out soldering • Observe safety precautions • Clean tools, equipment, workpiece and work place • Store tools, equipment and workpiece	conforms to technical specifications	**evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Clean parts to be soldered • Apply soldering flux • Perform soldering process **Principles:** The student should explain the principles of soldering **Theories:** The student should explain: • The soldering process • The importance of soldering flux • The tools used in soldering process • The importance of	equipment and safety gears are to be available: • Soldering gun • Charcoal stove/blow lamp • Wire brush • Work bench • Test hammer • Spark lighter • Combination pliers • Pair of tongs • Wire stripper • Tin snip • Gloves • Safety clear glasses • Overall • Safety boots	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						cleaning parts to be soldered **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while soldering • Safe handling of tools, equipment, and workpiece • Waste disposal		
4.0 Maintaining wheels and tyres	4.1 Repairing tubed tyres	(a) Replacing worn tyre	**Brainstorming:** Guide students to define a tyre and identify different types of tyres **Practical work:** Guide students on the various methods for replacing worn out tyres **Practical activity:** Organise students in manageable groups to identify and	**The student should be able to:** • Use the service manual • Select tools and equipment • Inspect tyres for wear • Replace tyre • Refill tyre pressure and foam materials • Perform tyre rotation • Observe safety	Replaced tyres function according to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Replace tyres • Refill tyre pressure and foam materials **Principles:** The student should explain the principles of:	The following tools, equipment and safety gears are to be available: • Vehicle • Stopper/blocks • Jack • Wheel spanner • Air compressor • Tyre pressure chart/service manual • Pressure gauge • Tyre changer machine	105

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			demonstrate how to replace worn out tyre in the motor vehicle mechanic's workshop	precautions • Clean tools, equipment and work place • Store tools and equipment		• Replacing worn tyre • Replacing tyres **Theories:** The student should explain: • The functions of tyres • The types of tyres • Interpretation of tyre dimensions and specifications • Properties of tyres • Importance replacing worn tyre **Circumstantial knowledge: Detailed knowledge about:** • Safety precautions while replacing tyres • Safe handling	• Tyre lever • File • Knife • Hot vulcanising machine • Valve key • Plier • Depth gauge • Tyre rag • Forklift/crane wagon • Helmet • Gloves • Safety boots • Overall • Safety clear glasses • Mask	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						of work tools and equipment • Waste disposal		
		(b) Refilling pressure and foam material in tyre	**Brainstorming:** Guide students to define pressure and foam material while identify different types of pressure and foam materials **Practical work:** Guide students on how to refill different types of pressure and foam materials **Practical activity:** Organise students in manageable groups to identify and demonstrate how to refill pressure and foam material in tyre in the motor vehicle mechanic's workshop	**The student should be able to:** • Use the service manual • Select tools and equipment • Inspect tyres for wear • Replace tyre • Refill tyre pressure and foam materials • Perform tyre rotation • Observe safety precautions • Clean tools, equipment, and work place • Store tools and equipment	Replaced tyres function according to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Replace tyres • Refill tyre pressure and foam materials **Principles:** The student should explain the principles of: • Replacing worn tyre • Replacing tyres **Theories:** The student should explain: • The functions of tyres • The types of tyres • Interpretation	The following tools, equipment and safety gears are to be available: • Vehicle • Stopper/blocks • Jack • Wheel spanner • Air compressor • Tyre pressure chart/service manual • Pressure gauge • Tyre changer machine • Tyre lever • File • Knife • Hot vulcanising machine • Valve key • Plier • Depth gauge • Tyre rag • Forklift/crane wagon • Helmet	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						of tyre dimensions and specifications • Properties of tyres • The importance replacing worn tyre **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while replacing tyres • Safe handling of work tools and equipment • Waste disposal	• Gloves • Safety boots • Overall • Safety clear glasses • Mask	
		(c) Perform tyre rotation	**Brainstorming:** Guide students to explain the concept of tyre rotation and identify different types tyre rotation **Practical work:** Guide students on the methods for performing	**The student should be able to:** • Use the service manual • Select tools and equipment • Perform tyre rotation • Check tyre	Repaired tyre conforms to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Perform tyre rotation	The following tools, equipment and safety gears are to be available: • Vehicle • Jacks • Wheel spanners • Tyre lever • Hammer or tyre	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			tyre rotations **Practical activity:** Organise students in manageable groups to identify and demonstrate the process for performing tyre rotation in the motor vehicle mechanic's workshop	pressure • Observe safety precautions • Clean tools, equipment, and work place • Store tools and equipment		**Principles:** The student should explain the principles of: • Constructing tube and tubeless tyres • Operating wheels and tyres • Servicing tube and tubeless tyres **Theories:** The student should explain: • The advantages of tyre rotation • Tread wear pattern • Factors affecting tyre life • The importance of maintaining tyre pressure **Circumstantial knowledge: Detailed**	bead breaker • Tyre changer • Air compressor • Depth gauge • Water bath • Puncture repair kit • Pressure gauge • Service manual • Hot vulcanising machine • Wheel blocks • Support/safety stands • Safety boots • Overalls • Gloves • Safety clear glasses	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						knowledge about: • Safety precautions while performing tyre rotation • Safe handling of tools and equipment • Waste disposal		
	5.2 Repairing tubeless tyres	(a) Repairing tube tyre	**Brainstorming:** Guide students to define tube tyre and identify different types tube tyres **Practical work:** Direct students on how to repair tube tyres **Practical activity:** Organise students in manageable groups to identify and demonstrate how to repair tube tyre in the motor vehicle mechanic's workshop	**The student should be able to:** • Use the service manual • Select tools and equipment • Repair tube tyre • Check tyre pressure • Observe safety precautions • Clean tools, equipment, and work place • Store tools and equipment	Repaired tyre conforms to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Repair tube tyre **Principles:** The student should explain the principles of: • Constructing tube tyre • Operating wheels and tyres • Servicing tube tyre **Theories:**	The following tools, equipment and safety gears are to be available: • Vehicle • Jacks • Wheel spanners • Tyre lever • Hammer or tyre bead breaker • Tyre changer • Air compressor • Depth gauge • Water bath • Puncture repair kit • Pressure gauge • Service manual • Hot vulcanising machine • Wheel blocks	125

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						The student should explain: • The advantages of tubeless tyres over tube tyres • Tread wear pattern • Factors affecting tyre life • The importance of maintaining tyre pressure **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while servicing tube tyre • Safe handling of tools and equipment • Waste disposal	• Support/safety stands • Safety boots • Overalls • Gloves • Safety clear glasses	
		(b) Repairing tubeless tyre	**Brainstorming:** Guide students to define tubeless tyre and	**The student should be able to:** • Use the service	Repaired tyre conforms to technical	**Knowledge evidence:** **Detailed**	The following tools, equipment and safety gears are to be	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			identify different types of tubeless tyres **Practical work:** Direct students on the various methods for repairing tubeless tyres **Practical activity:** Organise students in manageable groups to identify and demonstrate how to repair tubeless tyre in the motor vehicle mechanic's workshop	manual. • Select tools and equipment • Repair tubeless tyre • Check tyre pressure • Observe safety precautions • Clean tools, equipment, and work place • Store tools and equipment	specifications	**knowledge of:** **Method used:** The student should explain how to: • Repair tubeless tyre **Principles:** The student should explain the principles of: • Constructing tubeless tyre • Operating wheels and tyres • Servicing tubeless tyre **Theories:** The student should explain: • The advantages of tubeless tyres over tube tyres • Tread wear pattern • Factors affecting tyre life • The importance of	available: • Vehicle • Jacks • Wheel spanners • Tyre lever • Hammer or tyre bead breaker • Tyre changer • Air compressor • Depth gauge • Water bath • Puncture repair kit • Pressure gauge • Service manual • Hot vulcanising machine • Wheel blocks • Support/safety stands • Safety boots • Overalls • Gloves • Safety clear glasses	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						maintaining tyre pressure **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while servicing tubeless tyre • Safe handling of tools and equipment • Waste disposal		
	5.3 Performing wheel balancing	(a) Carrying out static balance	**Brainstorming:** Guide students to define a static balance and identify different instances of static balancing **Practical work:** Direct student on the various methods for performing different instances of static balancing **Practical activity:** Organise students in manageable groups to	**The student should be able to:** • Use the service manual • Select tools and equipment • Carry out static balance • Observe safety precautions • Clean tools, equipment and work place • Store tools and equipment	Balanced wheels conform to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Balance wheels statically **Principles:** The student should explain the principles of: • Wheel balancing	The following tools, equipment and safety gears are to be available: • Vehicle • Wheel balancing machine, tools, and accessories • Balancing weights • Wheels and tyres • Wire brush • Air compressor • Valve key	124

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			identify and demonstrate how to perform static balance in the motor vehicle mechanic's workshop			• Operating wheel balancing machines **Theories:** The student should explain: • Types of wheel balancing machines • The importance of wheel balancing **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while performing wheel balancing • Safe handling of work tools and equipment • Waste disposal	• Hammer • Jack • Wheel spanner • Service manual • Pressure gauge • Blocks/wedges • Safety stand • Gloves • Safety boots • Overall • Safety clear glass	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
		(b) Carrying out dynamic balance	**Brainstorming:** Guide students to define a dynamic balance and identify different instances of dynamic balancing **Practical work:** Direct students on the various methods for performing different instances of dynamic balance **Practical activity:** Organise students in manageable groups to identify and demonstrate how to perform dynamic balance in the motor vehicle mechanic's workshop	**The student should be able to:** • Use the service manual • Select tools and equipment • Carry out dynamic balance • Observe safety precautions • Clean tools, equipment, and work place • Store tools and equipment	Balanced wheels conform to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Balance wheels dynamically **Principles:** The student should explain the principles of: • Wheel dynamic • Operating wheel balancing machines **Theories:** The student should explain: • Types of wheel balancing machines • The importance of wheel balancing **Circumstantial**	The following tools, equipment and safety gears are to be available: • Vehicle • Wheel dynamic machine, tools, and accessories • Balancing weights • Wheels and tyres • Wire brush • Air compressor • Valve key • Hammer • Jack • Wheel spanner • Service manual • Pressure gauge • Blocks/wedges • Safety stand • Gloves • Safety boots • Overall • Safety clear glass	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						knowledge: **Detailed knowledge about:** • Safety precautions while performing wheel dynamic balancing • Safe handling of work tools and equipment • Waste disposal		
		(c) Performing tyre rotation	**Brainstorming:** Guide students to define tyre rotation and identify different types/methods of tyre rotation **Practical work:** Guide students on the various methods for performing tyre rotation **Practical activity:** Organise students in manageable groups to identify and demonstrate how to perform tyre rotation in	**The student should be able to:** • Use the service manual • Select tools and equipment • Carry out tyre rotation • Observe safety precautions • Clean tools, equipment, and work place • Store tools and equipment	Balanced wheels conform to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Balance wheels dynamically **Principles:** The student should explain the principles of: • Wheel rotation • Operating wheel	The following tools, equipment and safety gears are to be available: • Vehicle • Wheel balancing machine, tools, and accessories • Balancing weights • Wheels and tyres • Wire brush • Air compressor • Valve key • Hammer	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			the motor vehicle mechanic's workshop			balancing machines **Theories:** The student should explain: • Types of wheel balancing machines • Importance of wheel balancing **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while performing wheel rotation • Safe handling of work tools and equipment • Waste disposal	• Jack • Wheel spanner • Service manual • Pressure gauge • Blocks/wedges • Safety stand • Gloves • Safety boots • Overall • Safety clear glass	
	5.4 Servicing wheel hubs	(a) Servicing wheel hub components	**Brainstorming:** Guide students to define a wheel hub and identify components of a wheel hub	**The student should be able to:** • Use the service manual • Select tools and	Serviced wheel hub conforms to manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should	The following tools, equipment and safety gears are to be available: • Vehicle	105

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Practical work: Guide students on how to service different components of a wheel hub **Practical activity:** Organise students in manageable groups to identify and demonstrate how to service wheel hub component in the motor vehicle mechanic's workshop	equipment • Service wheel hub components • Observe safety precautions • Clean tools, equipment, and work place • Store tools and equipment		explain how to: • Service wheel hub components **Principles:** The student should explain the principles of constructing and operating wheel hubs. **Theories:** The student should explain: • The function of wheel hubs • Types of wheel hubs • The importance of wheel hub service **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while servicing wheel hub	• Jack • Tool kit • Service manual • Wheel spanner • Tyre lever • Spring balance • Pin punch/drift • Stoppers/blocks /wedge • Dial indicator • Overall • Safety boots • Gloves • Safety clear glasses	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						• Safe handling of tools and equipment • Waste disposal		
		(b) Adjusting wheel bearing tap play	**Brainstorming:** Guide students to define a wheel bearing and identify different types of wheel bearing **Practical work:** Guide students on the various methods for adjusting wheel bearing taps play **Practical activity:** Organise students in manageable groups to identify and demonstrate how to adjust wheel bearing tap play in the motor vehicle mechanic's workshop	**The student should be able to:** • Use the service manual • Select tools and equipment • Service wheel bearing • Adjust wheel bearing free play • Test wheel bearing • Observe safety precautions • Clean tools, equipment, and work place • Store tools and equipment	Serviced wheel bearing conforms to manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Service wheel bearing components • Adjust wheel bearing **Principles:** The student should explain the principles of wheel bearing construction and operation **Theories:** The student should explain:	The following tools, equipment and safety gears are to be available: • Vehicle • Jack • Tool kit • Service manual • Wheel spanner • Tyre lever • Spring balance • Pin punch/drift • Stoppers/blocks /wedge • Dial indicator • Overall • Safety boots • Gloves • Safety clear glasses	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						• The function of wheel bearing • Types of wheel bearing • Types of bearings • The importance of wheel bearing adjustment **Circumstantial knowledge:** **Detailed knowledge about:** • Observe safety precautions • Safe handling of tools and equipment		
	5.5 Servicing automatic tyre pressure monitoring system	(a) Diagnosing automatic tyre pressure monitoring system	**Brainstorming:** Guide students to brainstorm the concept of diagnosing automatic tyre pressure and identify different ways	**The student should be able to:** • Use the service manual • Select tools and equipment	Serviced automatic tyre pressure monitoring system conforms to manufacturer's	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should	The following tools, equipment and safety gears are to be available: • Vehicle fitted with ATPMS	105

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			of diagnosing automatic tyre pressure **Practical work:** Lead students to identify various methods for adjusting wheel bearing taps play **Practical activity:** Organise students in manageable groups to diagnose automatic tyre pressure monitoring system in the motor vehicle mechanic's workshop	• Identify system components • Diagnose automatic tyre pressure monitoring system • Service automatic tyre pressure monitoring system. • Observe safety precautions • Clean tools, equipment and work place • Store tools and equipment	specifications	explain how to: • Diagnose automatic tyre pressure monitoring system • Service automatic tyre pressure monitoring system **Principles:** The student should explain the principles of constructing automatic tyre pressure monitoring system **Theories:** The student should explain: • The function of automatic tyre pressure monitoring system	• Jack • Tool kit • Service manual • Wheel spanners • Tyre lever • Spring balance • Multimetre • Tyre pressure gauge • Pin punch/drift • Stoppers/blocks /wedge • Diagnostic tool • Overall • Safety boots • Gloves • Safety clear glasses	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						• Types automatic tyre pressure monitoring systems • The importance of automatic tyre pressure monitoring system **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while servicing automatic tyre pressure monitoring system • Safe handling of tools and equipment		
		(b) Repairing	**Brainstorming:**	**The student should**	Serviced air	**Knowledge**		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
		air supply system	Guide students to brainstorm on air supply system and identify different systems of air supply **Practical work:** Guide students on the various methods for repairing air supply systems **Practical activity:** Organise students in manageable groups for demonstrating how to repair air supply system in the motor vehicle mechanic's workshop	**be able to:** • Use the service manual • Select tools and equipment • Identify system components • Diagnose air supply system • Service air supply system • Observe safety precautions • Clean tools, equipment, and work place • Store tools and equipment	supply system conforms to manufacturer's specifications	**evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Diagnose air supply system • Service air supply system **Principles:** The student should explain the principles of constructing air supply system **Theories:** The student should explain: • The function of air supply system • Types of air supply systems • The importance of	The following tools, equipment and safety gears are to be available: • Vehicle fitted with ATPMS • Jack • Tool kit • Service manual • Wheel spanners • Tyre lever • Spring balance • Multimetre • Tyre pressure gauge • Pin punch/drift • Stoppers/blocks /wedge • Diagnostic tool • Overall • Safety boots • Gloves • Safety clear glasses	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						air supply system • **Circumstantial knowledge:** **Detailed knowledge about**: • Safety precautions while servicing air supply system • Safe handling of tools and equipment		

Form Two

Table 4*: Detailed Contents for Form Two*

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
1.0 Carrying out general vehicle services	1.1 Performing service of engine lubrication systems	(a) Changing engine oil	**Brainstorming:** Guide students to brainstorm on different types engine oil used in motor vehicle **Group discussion:** Guide students through manageable groups to discuss the standards methods used to select oil to be used in a particular engine **Practical Work:** Guide students through hands-on activities to select oil to be used in gasoline engine	**The student should be able to:** • Use the service manual • Select tools and equipment • Keep vehicle on level ground/hoist/service pit • Change engine oil • Check oil level • Test engine for oil leakage • Observe safety precautions • Clean tools, equipment, and work place • Store tools and equipment	engine oil changed according to manufacturer's specifications and recommendations	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Check oil condition and level • Change engine oil • Check for leakage **Principles:** The student should explain the principles of servicing engines **Theories:** The	The following tools, equipment and safety gears are to be available: • Vehicle or stationary engine • Tool kit • Filter wrench • Oil container (waste bin) • Funnel • Drain plug spanner (SST) • Vehicle hoist/pit • Service manual • Engine oil • Air compressor • Gloves • Overall • Safety boots	55

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						student should explain: • Types of lubricants • The importance of engine oil and oil filter • Use oils • Oil properties **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while servicing engine lubrication system • Safe handling of work tools and equipment • Waste disposal		
		(b) Changing engine oil filter	**Brainstorming:** Guide students to define an engine oil filter and	**The student should be able to:** • Use the service	Engine oil filter changed according to manufacturer's	**Knowledge evidence:** **Detailed**	The following tools, equipment and safety gears are to be	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			identify types of engine oil filters **Practical work:** Guide students on the methods for changing an engine oil filter **Practical activity:** Organise students in manageable groups to demonstrate the process of changing an engine oil filter in the motor vehicle mechanic's workshop	manual • Select tools and equipment • Keep vehicle on level ground/hoist/service pit • Change engine oil filter • Test engine for oil filter leakage • Observe safety precautions • Clean tools, equipment, and work place • Store tools and equipment	specifications and recommendations	**knowledge of:** **Method used:** The student should explain how to: • Check oil filter condition • Change engine oil filter **Principles:** The student should explain the principles of servicing engines **Theories:** The student should explain: • Types of engine oil filter • The importance of engine oil filter • Use engine oil	available: • Vehicle or stationary engine • Tool kit • Filter wrench • Oil container (waste bin) • Funnel • Drain plug spanner (SST) • Vehicle hoist/pit • Service manual • Engine oil filter • Air compressor • Gloves • Overall • Safety boots	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						filter • **Circumstantial knowledge: Detailed knowledge about:** • Safety precautions while servicing engine lubrication system • Safe handling of work tools and equipment • Waste disposal		
	1.2 Performing service of fuel system	(a) Changing fuel filter	**Brainstorming:** Guide students to define fuel filter and identify types of fuel filters **Practical work:** Guide students on the steps for changing fuel	**The student should be able to:** • Use the service manual • Select tools and equipment • Service air cleaner • Replace fuel filters	Serviced fuel system conforms to manufacturer's specifications	**Knowledge evidence: Detailed knowledge of: Method used:** The student should explain how to: • Service air	The following tools, equipment and safety gears are to be available: • Vehicle or stationary engine • Service manual • Tool kit	50

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			filter **Practical activity:** Organise students in manageable groups to demonstrate the process of changing fuel filter in the motor vehicle mechanic's workshop	• Prime fuel system • Bleed diesel fuel system • Test performance of fuel system • Servicing injector nozzles • Observe safety precautions • Clean tools, equipment, and work place • Store tools and equipment		filter • Service fuel filter • Prime fuel system • Bleed fuel system **Principles:** The student should explain principles of servicing fuel systems **Theories:** The student should explain: • The function of fuel systems and components • Types of fuel systems • The importance of servicing fuel system	• Air Compressor • Filter wrench (SST) • Fuel container • Covering blanket • Fuel pressure gauge • Overall • Safety boots • Gloves • Safety clear glasses	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						• Use of service manual **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while servicing fuel systems • Safe handling of tools, equipment, and parts • Waste disposal		
		(b) Changing air cleaner	**Brainstorming:** Guide students to define an air cleaner and identify types of air cleaners **Practical work:** Guide students on the methods for changing an air cleaner	**The student should be able to:** • Use the service manual • Select tools and equipment • Service air cleaner • Change air cleaner • Observe safety precautions	Changed air cleaner conforms to manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Change air cleaner **Principles:** The	The following tools, equipment and safety gears are to be available: • Vehicle or stationary engine • Service manual • Tool kit • Air Compressor • Filter wrench	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Practical activity: Organise students in manageable groups to demonstrate the process of changing an air cleaner in the motor vehicle mechanic's workshop	• Clean tools, equipment, and work place • Store tools and equipment		student should explain principles of changing air cleaner **Theories:** The student should explain: • Function of air cleaner • Types of air cleaner • The importance of changing air cleaner • Use of service manual **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while changing air cleaner • Safe handling of tools, equipment, and	(SST) • Fuel container • Overall • Air cleaner • Safety boots • Gloves • Safety clear glasses	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						parts • Waste disposal		
		(c) Performing fuel system bleeding	**Brainstorming:** Guide students to define a fuel system bleeding and identify different types of fuel system bleeding **Practical work:** Guide students on the various methods for performing fuel system bleeding **Practical activity:** Organise students in manageable groups to demonstrate the steps for performing fuel system bleeding in the motor vehicle mechanic's workshop	**The student should be able to:** • Use the service manual • Select tools and equipment • Prime fuel system • Bleed diesel fuel system • Test performance of fuel system • Servicing injector nozzles • Observe safety precautions • Clean tools, equipment, and work place • Store tools and equipment	Serviced fuel system conforms to manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Prime fuel system • Bleed fuel system **Principles:** The student should explain principles of performing fuel system bleeding **Theories:** The student should explain: • Function of fuel system bleeding and components • The importance of fuel system bleeding	The following tools, equipment and safety gears are to be available: • Vehicle or stationary engine • Service manual • Tool kit • Air Compressor • Filter wrench (SST) • Fuel container • Set of spanners • Fuel pressure gauge • Overall • Safety boots • Gloves • Safety clear glasses	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						• Use of service manual. **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while performing fuel system bleeding • Safe handling of tools, equipment, and parts • Waste disposal		
		(d) Servicing injector nozzles	**Brainstorming:** Guide students to define injector nozzles and identify different types of injector nozzles **Practical work:** Direct students on the various methods for servicing injector nozzles	**The student should be able to:** • Use the service manual • Select tools and equipment • Test performance of injector nozzles • Servicing injector nozzles	Serviced injector nozzles conform to manufacturer's specifications and recommendations	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Service injector nozzles	The following tools, equipment and safety gears are to be available: • Vehicle or stationary engine • Service manual • Tool kit • Air Compressor • Fuel container	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Practical activity: Organise students in manageable groups to demonstrate the procedure for servicing injector nozzles in the motor vehicle mechanic's workshop	• Observe safety precautions • Clean tools, equipment and work place • Store tools and equipment		**Principles:** The student should explain principles of servicing injector nozzles **Theories:** The student should explain: • Function of injector nozzles • Types of injector nozzles • The importance of servicing injector nozzles • Use of service manual **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while servicing injector nozzles • Safe handling of tools,	• Fuel pressure gauge • Overall • Safety boots • Gloves • Safety clear glasses	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						equipment, and parts • Waste disposal		
	1.3 Servicing cooling systems	(a) Checking engine coolant	**Brainstorming:** Guide students to define an engine coolant and identify different types of engine coolants **Practical work:** Direct students on the various methods for checking engine coolant **Practical activity:** Organise students in manageable groups to demonstrate the steps for checking engine coolant in the motor vehicle mechanic's workshop	**The student should be able to:** • Use the service manual • Select tools and equipment • Check engine coolant • Test cooling system performance • Observe safety precautions • Clean tools, equipment, and work place • Store tools and equipment	Serviced cooling system functions according to manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure of checking engine coolant **Principles:** The student should explain the rules of checking engine coolant • **Theories:** The student should explain the concept of Checking engine coolant • **Circumstantial knowledge:**	The following tools, equipment and safety gears are to be available: • Engine with complete cooling system • Thermometer • Tool kit • Cooling system analyzer • Water container • Service manual • Block check tester • Air compressor • Electric cooker/water heater • Gloves • Overall • Safety boots • Safety clear glasses	84

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						Detailed knowledge about: • Safety precautions while servicing cooling systems • Safe handling of work tools and equipment • Waste disposal		
		(b) Checking drive fan belt	**Brainstorming:** Guide students to define drive fan belt and identify types of drive fan belt **Practical work:** Direct students on the methods for checking drive fan belt **Practical activity:** Organise students in manageable groups to demonstrate how to	**The student should be able to:** • Use the service manual • Select tools and equipment • Replace fan and belts • Test drive fan belt performance • Observe safety precautions • Clean tools, equipment and work place	Checked drive fan belt functions according to manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure of checking drive fan belt **Principles:** The student should explain the principles of checking drive fan	The following tools, equipment and safety gears are to be available: • Engine with complete cooling system • Thermometer • Tool kit • Cooling system analyzer • Water container • Service manual • Block check tester	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			check drive fan belt in the motor vehicle mechanic's workshop	• Store tools and equipment		belt **Theories:** The student should explain the rules of checking drive fan belt **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while checking drive fan belt • Safe handling of work tools and equipment • Waste disposal	• Air compressor • Electric cooker/water heater • Gloves • Overall • Safety boots • Safety clear glasses	
		(c) Checking the operation of a thermostat	**Brainstorming:** Guide students to brainstorm the concept of checking the operation of a thermostat **Practical work:** Direct student on the methods of checking the	**The student should be able to:** • Use the service manual • Select tools and equipment • Check engine coolant • Replace thermostat	Checked thermostat functions according to manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure for checking the	The following tools, equipment and safety gears are to be available: • Engine with complete cooling system • Thermometer. • Tool kit	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			operation of the thermostat **Practical activity:** Organise students in manageable groups to demonstrate how to check the operation of the thermostat in the motor vehicle mechanic's workshop	• Check operation of thermostat • Observe safety precautions • Clean tools, equipment, and work place • Store tools and equipment		operational of a thermostat **Principles:** The student should explain the principles of checking the operation of a thermostat **Theories:** The student should explain the rules of checking the operation of a thermostat **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while checking the operation of a thermostat • Safe handling of work tools and equipment	• Cooling system analyzer • Water container • Service manual • Block check tester • Air compressor • Electric cooker/water heater • Gloves • Overall • Safety boots • Safety clear glasses	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						• Waste disposal		
		(d) Servicing water pump	**Brainstorming:** Guide students to define a water pump and identify types of water pumps **Practical work:** Direct students on the methods for servicing water pump **Practical activity:** Organise students in manageable groups to demonstrate how to service water pump in the motor vehicle mechanic's workshop	**The student should be able to:** • Use the service manual • Select tools and equipment • Check water pump • Check operation of water pump • Service water pump • Test water pump performance • Observe safety precautions • Clean tools, equipment, and work place • Store tools and equipment	Serviced water pump functions according to manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure of servicing water pump **Principles:** The student should explain the principles of servicing water pump **Theories:** The student should explain the rules of servicing water pump **Circumstantial knowledge:** **Detailed knowledge about:** • Safety	The following tools, equipment and safety gears are to be available: • Engine with complete cooling system • Thermometer • Tool kit • Cooling system analyzer • Water container • Service manual • Block check tester • Air compressor • Electric cooker/water heater • Gloves • Overall • Safety boots • Safety clear glasses	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						precautions while servicing water pump • Safe handling of work tools and equipment • Waste disposal		
		(e) Servicing radiator	**Brainstorming:** Guide students to define a radiator and identify types of radiators **Practical work:** Direct student on the methods for servicing a radiator **Practical activity:** Organise students in manageable groups to demonstrate the steps for servicing a radiator in the motor vehicle mechanic's workshop	**The student should be able to:** • Use the service manual. • Select tools and equipment. • Check radiator • Check operation of radiator • Service radiator • Test radiator • performance • Observe safety precautions • Clean tools, equipment, and work place • Store tools and equipment	Serviced radiator functions according to manufacturer's specifications.	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure of servicing a radiator **Principles:** The student should explain the principles of servicing radiator **Theories:** The student should explain the rules of servicing a radiator	The following tools, equipment and safety gears are to be available: • Engine with complete cooling system • Thermometer • Tool kit • Cooling system analyser • Water container • Service manual • Block check tester • Air compressor • Electric cooker/water heater • Gloves	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						Circumstantial knowledge: **Detailed knowledge about:** • Safety precautions while servicing radiator • Safe handling of work tools and equipment • Waste disposal	• Overall • Safety boots • Safety clear glasses	
	1.4 Performing service of transmission systems	(a) Checking clutch free play	**Brainstorming:** Guide students to explain the concept of clutch free play and identify types of clutch free play **Practical work:** Direct student on the steps for checking clutch free play **Practical activity:** Organise students in manageable groups to	**The student should be able to:** • Use the service manual • Select tools and equipment • Check clutch free play • Observe safety precautions • Clean tools, equipment, and work place • Store tools,	Checked clutch free play conforms to manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure of checking clutch free play **Principles:** The student should explain the principles of	The following tools, equipment and safety gears are to be available: • Vehicle • Service manual • Tool kit • Oil container with supply pipe and pump • Drain plug spanner (SST) • Stethoscope • Service	55

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			demonstrate the process for checking clutch free play in the motor vehicle mechanic's workshop	equipment, and parts		checking clutch free play **Theories:** The student should explain the rules of checking clutch free play **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while checking clutch free play and components • Safe handling of work tools and equipment • Waste disposal	pit/vehicle hoist • Overall • Gloves • Safety boots • Safety clear glasses	
		(b) Servicing gear box	**Brainstorming:** Guide students to define a gear box and identify types of gear boxes **Practical work:** Direct students on the	**The student should be able to:** • Use the service manual • Select tools and equipment • Check gear box	Serviced gear box operates as per manufacturer's recommendations.	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the	The following tools, equipment and safety gears are to be available: • Vehicle • Service manual • Tool kit	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			various methods for servicing a gear box **Practical activity:** Organise students in manageable groups to demonstrate the steps for servicing a gear box in the motor vehicle mechanic's workshop	• Observe safety precautions • Clean tools, equipment, and work place • Store tools, equipment, and parts		procedure of servicing a gear box **Principles:** The student should explain the principles of servicing a gear box **Theories:** The student should explain the rules of servicing a gear box **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while servicing a gear box and components • Safe handling of work tools and	• Oil container with supply pipe and pump • Drain plug spanner (SST) • Stethoscope • Service pit/vehicle hoist • Overall • Gloves • Safety boots • Safety clear glasses	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						equipment • Waste disposal		
		(c) Servicing propeller shaft	**Brainstorming:** Guide students to define a propeller shaft and identify different types of propeller shaft **Practical work:** Demonstrate to students the various methods for servicing propeller shaft **Practical activity:** Organise students in manageable groups to demonstrate the procedure for servicing propeller shaft in the motor vehicle mechanic's workshop	**The student should be able to:** • Use the service manual • Select tools and equipment • Check propeller shaft • Observe safety precautions • Clean tools, equipment, and work place • Store tools, equipment, and parts	Serviced propeller shaft operates as per manufacturer's recommendations	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure of servicing a propeller shaft **Principles:** The student should explain the principles of servicing a propeller shaft **Theories:** The student should explain the rules of servicing a propeller shaft **Circumstantial knowledge:**	The following tools, equipment and safety gears are to be available: • Vehicle • Service manual • Tool kit • Oil container with supply pipe and pump • Drain plug spanner (SST) • Stethoscope • Service pit/vehicle hoist • Overall • Gloves • Safety boots • Safety clear glasses	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						Detailed knowledge about: • Safety precautions while servicing propeller shaft and components • Safe handling of work tools and equipment • Waste disposal		
		(d) Servicing final drive and differential	**Brainstorming:** Guide students to define final drive and differential and identify different types of final drive and differential **Practical work:** Lead students to identify various methods for servicing final drive and differential **Practical activity:** Organise students in manageable groups to	**The student should be able to:** • Use the service manual • Select tools and equipment • Check final drive and differential • Observe safety precautions • Clean tools, equipment, and work place • Store tools,	Serviced final drive and differential operates as per manufacturer's recommendations	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure of Servicing final drive and differential. **Principles:** The student should explain the	The following tools, equipment and safety gears are to be available: •Vehicle •Service manual •Tool kit •Oil container with supply pipe and pump •Drain plug spanner (SST) •Stethoscope •Service pit/vehicle	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			demonstrate the steps for servicing final drive and differential in the motor vehicle mechanic's workshop	equipment, and parts		principles of Servicing final drive and differential **Theories:** The student should explain the rules of servicing final drive and differential **Circumstantial knowledge: Detailed knowledge about:** • Safety precautions while servicing final drive and differential and components • Safe handling of work tools and equipment • Waste disposal	hoist •Overall •Gloves •Safety boots •Safety clear glasses	
	1.5 Performing greasing	(a) Carrying out chassis greasing	**Brainstorming:** Guide students to define chassis greasing and	**The student should be able to:** • Use the service	Greased chassis operates as per manufacturer's	**Knowledge evidence: Detailed**	The following tools, equipment and safety gears are to be	44

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			identify different types of chassis greasing **Practical work:** Guide students on discussing various methods of chassis greasing **Practical activity:** Organise students in manageable groups to demonstrate the procedure for chassis greasing in the motor vehicle mechanic's workshop	manual • Select tools and equipment • Check chassis greasing • Observe safety precautions • Clean tools, equipment, and work place • Store tools, equipment, and parts	recommendations	**knowledge of:** **Method used:** The student should explain the procedure of performing chassis greasing **Principles:** The student should explain the principles of performing chassis greasing **Theories:** The student should explain the rules of servicing final drive and differential **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions taken while performing chassis greasing	available: •Vehicle •Grease •Service manual •Tool kit •Oil container with supply pipe and pump •Drain plug spanner (SST) •Stethoscope •Service pit/vehicle hoist •Overall •Gloves •Safety boots •Safety clear glasses	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						and components • Safe handling of work tools and equipment • Waste disposal		
		(b) Lubricating door locks and hinges	**Brainstorming:** Guide students to explain the concept of door locks and hinges and identify types of door locks and hinges **Practical work:** Guide students on the various methods of lubricating door locks and hinges **Practical activity:** Organise students in manageable groups to demonstrate the procedure for lubricating door locks and hinges in the motor vehicle mechanic's workshop	**The student should be able to:** • Use the service manual • Select tools and equipment • Check chassis greasing • Observe safety precautions • Clean tools, equipment, and work place • Store tools, equipment, and parts	Lubricated door locks and hinges operates as per manufacturer's recommendations	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure of Lubricating door locks and hinges **Principles:** The student should explain the principles of lubricating door locks and hinges **Theories:** The student should explain the rules of lubricating door locks and hinges **Circumstantial**	The following tools, equipment and safety gears are to be available: •Vehicle •Service manual •Tool kit •Oil container with supply pipe and pump •Drain plug spanner (SST) •Stethoscope •Service pit/vehicle hoist •Overall •Gloves Grease •Safety boots •Safety clear glasses	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						knowledge: **Detailed knowledge about:** • Safety precautions taken while Lubricating door locks and hinges and components • Safe handling of work tools and equipment • Waste disposal		
2.0 Carrying out general maintenance on electrical and electronic systems	2.1 Maintaining batteries	(a) Checking electrolyte level	**Brainstorming:** Guide students to identify battery electrolyte and its composition **Practical Work:** Guide students on how to check the battery electrolyte level **Practical activity:** Organise students in	**The student should be able to:** • Select tools and equipment • Disconnect and remove the battery from the vehicle • Service the battery • Mount the battery to the vehicle • Read the battery electrolyte level • Fill electrolyte in the	Battery electrolyte level is well checked as per technical or manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Read and check electrolyte level • Fill electrolyte in the battery **Principles:** The student should	The following tools, equipment and safety gears are to be available: • Vehicle • Battery charger • Battery electrolyte • Distilled or ionized water • Wire brush • Tool kit • Multimetre	55

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			manageable groups to check the electrolyte level. Also, encourage them to use the internet, manufacturer's manual, and library books to explore modern methods of checking battery's electrolyte level	battery • Observe safety precautions • Clean tools, equipment, and work place • Store tools and equipment		explain the principles of: • Checking electrolyte level **Theories:** The student should explain: • Types of water used to add in battery electrolyte • Chemical composition of the battery • Handling of the battery electrolyte **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions filling battery electrolyte • Safe handling	• Plastic container • Thermometer • Water sucker • Safety clear glasses • Overall • Plastic gloves • Safety boots	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						of tools and equipment • Waste disposal		
		(b) Checking the battery's state of charge	**Brainstorming:** Guide students to identify the battery electrolyte and its composition **Practical Work:** Guide students on how to check the battery electrolyte level **Practical activity:** Organise students in manageable groups to check the electrolyte level. Also, encourage them to use the internet, manufacturer's manual, and library books to explore modern methods of checking battery's electrolyte level	**The student should be able to:** • Select tools and equipment • Remove battery from vehicle • Check battery state of charge • Service battery • Mount battery to vehicle • Test battery • Observe safety precautions • Clean tools, equipment, and work place • Store tools and equipment	Maintained battery produces output voltage as per technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure of Checking state of charge of battery **Principles:** The student should explain the principles of checking battery's state of charge **Theories:** The student should explain the rules of checking the battery's state of charge **Circumstantial knowledge:** **Detailed knowledge about:** • Safety	The following tools, equipment and safety gears are to be available: • Vehicle • Battery charger • Hydrometer • High-rate discharge tester • Wire brush • Tool kit • Multimeter • Plastic container • Thermometer • Water sucker • Safety clear glasses • Overall • Plastic gloves • Safety boots	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						precautions while checking battery's state of charge • Safe handling of tools and equipment • Waste disposal		
		(c) Performing battery charging	**Brainstorming:** Guide students to identify battery electrolyte and its composition **Practical Work:** Guide students how to check the battery electrolyte level **Practical activity:** Organise students in manageable groups to check the electrolyte level. Also, encourage them to use the internet, manufacturer's manual, and library books to	**The student should be able to:** • Select tools and equipment • Remove the battery from the vehicle • Check the battery's state of charge • Service the battery • Mount the battery to the vehicle • Test the battery • Observe safety precautions • Clean tools, equipment, and work place • Store tools and	Maintained battery produces output voltage as per technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure of performing battery charging **Principles:** The student should explain the principles of performing battery charging **Theories:** The student should	The following tools, equipment and safety gears are to be available: • Vehicle • Battery charger • Hydrometer • High-rate discharge tester • Wire brush. • Tool kit. • Multimeter. • Plastic container • Thermometer • Water sucker • Safety clear glasses • Overall	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			explore modern methods of checking electrolyte level	equipment		explain the rules of Performing battery charging **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while performing battery charging • Safe handling of tools and equipment • Waste disposal	• Plastic gloves • Safety boots	
	2.2 Constructing simple electronic circuits	(a) Building simple series circuit	**Brainstorming:** Guide students to define a simple series circuit and identify different types of simple series circuits **Practical Work:**	**The student should be able to:** • Interpret electrical circuit diagrams • Select tools and equipment • Build simple series circuit	Constructed simple series circuit conform to required instructions	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure of	The following tools, equipment and safety gears are to be available: • Tool kit • Multimetre • Set of different wires and	50

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Guide students on how to check simple series circuit **Practical activity:** Organise students in manageable groups to build simple series circuit. Also, encourage them to use the internet, manufacturer's manual, and library books to explore various modern methods of building simple series circuits	• Measure electrical quantities • Observe safety precautions • Clean tools, equipment, and work place • Store tools and equipment		building a simple series circuit **Principles:** The student should explain the principles of building a simple series circuit **Theories:** The student should explain the rules of building a simple series circuit **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while building simple series circuit • Safe handling of work tools and equipment	connectors • Test lamp • Wire stripping plier • Service manual • Clamp on meter • Work bench • Circuit boards • Safety boots • Gloves • Overall	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						• Waste disposal		
		(b) Building simple parallel circuit	**Brainstorming:** Guide students to define simple parallel circuit and identify different ways of building simple parallel circuit **Practical work:** Guide students on the various methods of building simple parallel circuit **Practical activity:** Organise students in manageable groups to demonstrate the procedure for building simple parallel circuit in the motor vehicle mechanic's workshop	**The student should be able to:** • Interpret electrical circuit diagrams • Select tools and equipment • Build simple parallel circuit • Measure electrical quantities • Observe safety precautions • Clean tools, equipment, and work place • Store tools and equipment	Constructed simple parallel circuit conform to required instructions	**Knowledge evidence: Detailed knowledge of: Method used:** The student should explain the procedure for building simple parallel circuit **Principles:** The student should explain the principles of building simple parallel circuit **Theories:** The student should explain the rules of building simple parallel circuit **Circumstantial knowledge: Detailed**	The following tools, equipment and safety gears are to be available: • Tool kit • Multimetre • Set of different wires and connectors • Test lamp • Wire stripping plier • Service manual • Clamp on meter • Work bench • Circuit boards • Safety boots • Gloves • Overall	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						knowledge about: • Safety precautions while building simple parallel circuit • Safe handling of work tools and equipment • Waste disposal		
		(c) Building combination circuit	**Brainstorming:** Guide students to define combination circuit and identify different types of combination circuit **Practical work:** Guide students on the various methods for building combination circuit **Practical activity:** Organise students in	**The student should be able to:** • Interpret electrical circuit diagrams • Select tools and equipment • Build combination circuit • Measure electrical quantities • Observe safety precautions • Clean tools, equipment, and	Constructed combination circuit and measured electrical quantities conform to required instructions	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure of building combination circuit. **Principles:** The student should explain the	The following tools, equipment and safety gears are to be available: • Tool kit • Multimetre • Set of different wires and connectors • Test lamp • Wire stripping plier • Service manual • Clamp on meter	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			manageable groups to demonstrate the procedure for building combination circuit in the motor vehicle mechanic's workshop	work place • Store tools and equipment		principles of Building combination circuit **Theories:** The student should explain the rules of Building combination circuit **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while building combination circuit • Safe handling of work tools and equipment • Waste disposal	• Work bench • Circuit boards • Safety boots • Gloves • Overall	
		(d) Measuring	**Brainstorming:**	**The student should be**	Constructed circuit	**Knowledge**	The following tools,	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
		electrical quantities (voltage, current, resistance and power)	Guide students to define electrical quantities (voltage, current, resistance and power) and identify different types of electrical quantities (voltage, current, resistance and power) **Practical work:** Guide students on the various methods for electrical quantities (voltage, current, resistance and power) **Practical activity:** Organise students in manageable groups to demonstrate how to measure electrical quantities (voltage, current, resistance and power) in motor vehicle mechanic's workshop	**able to:** • Interpret electrical and electronic circuit diagrams • Select tools and equipment • Measure electrical quantities (voltage, current, resistance and power • Observe safety precautions • Clean tools, equipment, and work place • Store tools and equipment	and measured electrical quantities conform to required instructions	**evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure of Measuring electrical quantities (voltage, current, resistance and power) **Principles:** The student should explain the principles of measuring electrical quantities (voltage, current, resistance and power) **Theories:** The student should explain rules of measuring electrical quantities (voltage, current, resistance	equipment and safety gears are to be available: • Tool kit • Multimetre • Set of different wires and connectors • Test lamp • Wire stripping plier • Service manual • Clamp on meter • Work bench • Circuit boards • Safety boots • Gloves • Overall	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						and power) **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while measuring electrical quantities (voltage, current, resistance and power) • Safe handling of work tools and equipment • Waste disposal		
	2.3 Constructing simple electronic circuits	(a) Testing characteristics of active electronic components (diodes, transistors,	**Brainstorming:** Guide students to define the characteristics of active electronic components (diodes, transistors, and thyristors)	**The student should be able to:** • Select tools and equipment • Select electronic components • Test active	Tested components and constructed circuits show characteristics that conform to specifications as given in component	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the	The following tools, equipment and safety gears are to be available: • Work bench • Digital and analogue	72

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
		and thyristors)	**Practical work:** Lead students to identify various methods for testing characteristics of active electronic components (diodes, transistors, and thyristors) **Practical activity:** Organise students in manageable groups to test the characteristics of active electronic components (diodes, transistors, and thyristors) in the motor vehicle mechanics work shop	electronic components • Record test results • Construct active electronic circuits • Interpret standard test results • Observe safety regulations • Clean tools, equipment, and workplace • Store tools, equipment, and components	data books	procedure of testing characteristics of active electronic components (diodes, transistors, and thyristors) **Principles:** The student should explain the principles of testing the characteristics of active electronic components (diodes, transistors, and thyristors) **Theories:** The student should explain the rules of Testing the characteristics active electronic components (diodes, transistors, and	Multimetre • Oscilloscope • Curve tracer • Tool kit • Circuit boards • Work bench • Gloves • Overcoat • Overall • Boots	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						thyristors) **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions in electronic work • Safe handling of tools, test equipment and measuring instruments • Safe handling of electronic components		
		(b) Testing characteristics of passive electronic components	**Brainstorming:** Guide students to explain the concept of characteristics of passive electronic components and identify different characteristics of passive electronic components **Practical work:**	**The student should be able to:** • Select tools and equipment • Select electronic components • Test active electronic components • Test passive	Tested components and constructed circuits show characteristics that conform to specifications as given in component data books	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure of testing characteristics of	**This element can be achieved at school training workshop** The following tools, equipment and safety gears are to be available: • Work bench • Digital and analogue	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Guide students on the various methods for testing the characteristics of passive electronic components **Practical activity:** Organise students in manageable groups for testing characteristics of passive electronic components in motor vehicle mechanic's workshop	electronic components • Interpret standard test results • Observe safety regulations • Clean tools, equipment, and workplace • Store tools, equipment, and components		passive electronic components **Principles:** The student should explain the principles of testing the characteristics of passive electronic components . **Theories:** The student should explain the rules of characteristics of passive electronic components **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions in electronic work • Safe handling of tools, test	Multimetre • Oscilloscope • Curve tracer • Tool kit • Circuit boards • Work bench • Gloves • Overcoat • Overall • Boots	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						equipment, and measuring instruments • Safe handling of electronic components		
		(c) Testing characteristics of optoelectronic components	**Brainstorming:** Guide students to explain the concept of testing the characteristics of optoelectronic components and identify different methods of testing the characteristics of optoelectronic components **Practical work:** Guide students on the various methods for testing characteristics of optoelectronic components **Practical activity:** Organise students in manageable groups for testing characteristics of	**The student should be able to:** • Select tools and equipment • Select electronic components • Test characteristics of optoelectronic components • Record test results • Observe safety regulations • Clean tools, equipment, and workplace • Store tools, equipment, and components	Tested components and constructed circuits show characteristics that conform to specifications as given in component data books	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure of testing characteristics of optoelectronic components **Principles:** The student should explain the principles of testing characteristics of optoelectronic components **Theories:** The student should	The following tools, equipment and safety gears are to be available: • Work bench • Digital and analogue Multimetre • Oscilloscope • Curve tracer • Tool kit • Circuit boards • Work bench • Gloves • Overcoat • Overall • Boots	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			optoelectronic components in motor vehicle mechanic's workshop			explain the rules of testing the characteristics of optoelectronic components **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions in electronic work • Safe handling of tools, test equipment and measuring instruments • Safe handling of electronic components		
		(d) Constructing inductive circuits	**Brainstorming:** Guide students to define inductive circuits and	**The student should be able to:** • Select tools and	Tested components and constructed circuits show	**Knowledge evidence:** **Detailed**	**This element can be achieved at school training workshop.**	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			identify different types of inductive circuits **Practical work:** Guide students on the various methods for constructing inductive circuits **Practical activity:** Organise students in manageable groups for constructing inductive circuits in the motor vehicle mechanic's workshop	equipment • Select electronic components • Constructing inductive circuits • Test inductive circuits • Record test results • Interpret standard test results • Observe safety regulations • Clean tools, equipment, and workplace • Store tools, equipment, and components	characteristics that conform to specifications as given in component data books	**knowledge of:** **Method used:** The student should explain the procedure of constructing inductive circuits **Principles:** The student should explain the principles of constructing inductive circuits **Theories:** The student should explain the rules of constructing inductive circuits **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions in	The following tools, equipment and safety gears are to be available: • Work bench • Digital and analogue Multimetre • Oscilloscope • Curve tracer • Tool kit • Circuit boards • Work bench • Gloves • Overcoat • Overall • Boots	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						electronic work • Safe handling of tools, test equipment, and measuring instruments • Safe handling of electronic components		
		(e) Constructing a simple capacitive circuit	**Brainstorming:** Guide students to define simple capacitive circuit and identify different types of simple capacitive circuits **Practical work:** Guide students on the various methods for constructing a simple capacitive circuit **Practical activity:** Organise students in manageable groups for	**The student should be able to:** • Select tools and equipment • Select electronic components • Test a simple capacitive circuit • Record test results • Construct a simple capacitive circuit • Interpret standard test results • Observe safety regulations • Clean tools,	Tested components and constructed circuits show characteristics that conform to specifications as given in component data books	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure of constructing a simple capacitive circuit **Principles:** The student should explain the principles of constructing a	The following tools, equipment and safety gears are to be available: • Work bench • Digital and analogue MultiMate • Oscilloscope • Curve tracer • Tool kit • Circuit boards • Work bench • Gloves • Overcoat • Overall	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			constructing a simple capacitive circuit in the motor vehicle mechanic's workshop	equipment, and workplace • Store tools, equipment, and components		simple capacitive circuit **Theories:** The student should explain the rules of constructing a simple capacitive circuit **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions in electronic work • Safe handling of tools, test equipment, and measuring instruments • Safe handling of electronic components	• Boots	
		(f) Constructing	**Brainstorming:**	**The student should be**	Tested components	**Knowledge**	The following tools,	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
		combined (RLC) circuit	Guide students to define the combined (RLC) circuit and identify different types of combined (RLC) circuits **Practical work:** Guide students on the various methods of constructing combined (RLC) circuit **Practical activity:** Organise students in manageable groups for constructing combined (RLC) circuit in the motor vehicle mechanic's workshop	**able to:** • Select tools and equipment • Select electronic components • Test combined (RLC) circuit • Test combined (RLC) circuit components • Record test results • Interpret standard test results • Observe safety regulations • Clean tools, equipment, and workplace • Store tools, equipment, and components	and constructed circuits show characteristics that conform to specifications as given in component data books	**evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure of Constructing combined (RLC) circuit **Principles:** The student should explain the principles of constructing combined (RLC) circuit **Theories:** The student should explain the construction of combined (RLC) circuit **Circumstantial knowledge:** **Detailed knowledge about:** • Safety	equipment and safety gears are to be available: • Work bench • Digital and analogue Multimetre • Oscilloscope • Curve tracer • Tool kit • Circuit boards • Work bench • Gloves • Overcoat • Overall • Boots	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						precautions in electronic work • Safe handling of tools, test equipment, and measuring instruments • Safe handling of electronic components		
	2.4 Serving conventional ignition system	(a) Diagnosing Ignition Systems	**Brainstorming:** Guide students to define an ignition system and identify different methods of diagnosing ignition systems **Practical work:** Guide students on the various methods of diagnosing ignition systems **Practical activity:** Organise students in	**The student should be able to:** • Interpret ignition circuit diagrams • Select tools and equipment • Diagnose faults in ignition system circuit • Rectify defective components • Test ignition system • Observe safety precautions	Serviced ignition system functions according to technical specifications	**Knowledge evidence: Detailed knowledge of: Method used:** The student should be able to explain the procedure of diagnosing ignition systems **Principles:** The student should explain the principle of	The following tools, equipment and safety gears are to be available: • Vehicle with conventional ignition system or training model (simulator) • Tool kit • Multimetre • Spark plug service machine • Hydrometer	55

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			manageable groups for diagnosing ignition systems in the motor vehicle mechanic's workshop	• Clean tools, equipment and work place • Store tools and equipment		diagnosing ignition systems **Theories:** The student should explain the rules of diagnosing ignition systems **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while working with ignition systems • Safe handling of work tools and equipment • Waste disposal	• High-rate discharge tester • Stroboscope • Wire stripper • Oscilloscope • Ignition coil tester • Test lamp • Soldering gun • Overall • Safety boot • Gloves	
		(b) Repairing ignition system components	**Brainstorming:** Guide students to explain the concept of ignition system components and	**The student should be able to:** • Interpret ignition circuit diagrams	Serviced ignition system components function according to technical	**Knowledge evidence:** **Detailed knowledge of:**	This element can be achieved at school training workshop. The following tools,	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			identify different components of the ignition system **Practical work:** Guide students on the various methods of repairing ignition system components **Practical activity:** Organise students in manageable groups for repairing ignition system components in the motor vehicle mechanic's workshop	• Select tools and equipment • Diagnose faults in ignition system component • Rectify defective components • Test ignition system components • Observe safety precautions • Clean tools, equipment, and work place • Store tools and equipment	specifications	**Method used:** The student should be able to explain the procedure of repairing ignition system components **Principles:** The student should explain the principle of repairing ignition system components **Theories:** The student should explain the rules of repairing ignition system components **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while working with ignition	equipment and safety gears are to be available: • Vehicle with conventional ignition system or training model (simulator) • Tool kit • Multimetre • Spark plug service machine • Hydrometer • High-rate discharge tester • Stroboscope • Wire stripper • Oscilloscope • Ignition coil tester • Test lamp • Soldering gun • Overall • Safety boot • Gloves	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						systems • Safe handling of work tools and equipment • Waste disposal		
	2.5 Servicing electronic ignition systems	(a) Servicing electronic ignition components	**Brainstorming:** Guide students to explain the concept of electronic ignition components and identify different components of electronic ignition system **Practical work:** Guide students on the various methods of servicing electronic ignition components **Practical activity:** Organise students in manageable groups for servicing electronic ignition components in the motor vehicle	**The student should be able to:** • Use the service manual • Select tools and equipment • Interpret circuit diagrams • Select tools and equipment • Check the battery condition • Perform on board diagnosis • Inspect ignition wiring • Perform spark test • Test ignition coil/power igniter • Service electronic	Ignition system serviced as per manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure of servicing electronic ignition components **Principles:** The student should explain the principles of servicing electronic ignition components	The following tools, equipment and safety gears are to be available: • Work bench • Vehicle with electronic ignition system • Computer controlled system simulator • Tool kit • Engine analyzer/timing light torch/oscilloscope • Diagnostic computer	44

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			mechanic's workshop	type distributor • Adjust dwell angle • Service spark plugs and cables • Check firing order • Adjust ignition timing • Test ignition system • Observe safety precautions • Clean tools and workplace • Store tools, equipment, and parts		**Theories:** The student should explain the rules of servicing electronic ignition components **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while servicing electronic ignition system • Safe handling of work tools, equipment, and parts • Waste disposal	• Service wire (special) • Clamp-on meter • Trouble codes identification chart • Spark plug tester • Spark plug cleaning machine • Flat needle file • Dwell meter • Service manual • Multimetre • High-rate discharge tester • Hydrometer • Wire brush • Wire jumpers • Battery charger • Overall • Safety boots • Gloves	
	2.6 Maintaining	(b) Checking	**Brainstorming:**	**The student should be**	Checked headlamp	**Knowledge**	The following tools,	32

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
	the lighting system	headlamp circuit	Guide students to define headlamp circuit, identify different types of headlamps, and explain the concept of checking headlamp circuit **Practical work:** Guide students on the various methods of checking headlamp **Practical activity:** Organise students in manageable groups for checking headlamp in the motor vehicle mechanic's workshop	**able to:** • Interpret lighting circuit diagrams • Use the service manual • Select tools and equipment • Checking headlamp • Checking headlamp circuit • Rectify headlamp circuit • Observe safety precautions • Clean tools, equipment, and work place • Store tools and equipment	circuit functions according to technical specifications	**evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure of checking headlamp circuit **Principles:** The student should explain the principles of operation of the headlamp circuit • **Theories:** The student should explain the rules of headlamp checking circuit **Circumstantial knowledge:** **Detailed knowledge about:**	equipment and safety gears are to be available: • Vehicle • Wire brush • Tool kit • Multimetre • Safety clear glasses • Overall • Plastic gloves • Safety boots • Work bench • Gloves • Respiratory mask • Set of different wire connectors • Test lamp • Service manual • Clamp on meter • Soldering gun • • AC/DC Generator and starter Motor test bench	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						• Safety precautions while Checking headlamp circuit safe handling of work tools and equipment • Waste disposal	• Spark plug service machine • Ignition coil tester • Oscilloscope • Electronic diagnosis equipment/tool	
		(c) Checking turn signals and hazard lights	**Brainstorming:** Guide students to define turn signals and hazard lights and identify different types of turn signals and hazard lights **Practical work:** Guide students on the various methods of checking turn signals and hazard lights **Practical activity:** Organise students in	**The student should be able to:** • Interpret turn signals and hazard lights • Use the service manual • Select tools and equipment • Checking turn signals and hazard lights • Rectify lighting defective components	Checked turn signals and hazard lights function according to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure of checking turn signals and hazard lights **Principles:** The student should explain the	The following tools, equipment and safety gears are to be available: • Vehicle • Wire brush • Tool kit • Multimetre • Safety clear glasses • Overall • Plastic gloves • Safety boots • Work bench • Gloves	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			manageable groups for checking turn signals and hazard lights in the motor vehicle mechanic's workshop	• Observe safety precautions • Clean tools, equipment, and work place • Store tools and equipment		principle operations of checking turn signals and hazard lights **Theories:** • The student should explain the rules of checking turn signals and hazard lights **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while checking lighting systems • Safe handling of work tools and equipment	• Respiratory mask • Set of different wire connectors • Test lamp • Service manual • Clamp on meter • Soldering gun • AC/DC generator and starter motor test bench • Spark plug service machine • Ignition coil tester • Oscilloscope • Electronic diagnosis equipment/tool	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						• Waste disposal		
		(d) Servicing brake lights	**Brainstorming:** Guide students to brainstorm the brake lights and identify different types of brake lights **Practical work:** Guide students on the various methods of servicing brake lights **Practical activity:** Organise students in manageable groups for servicing brake lights in the motor vehicle mechanic's workshop	**The student should be able to:** • Interpret brake lights diagrams • Use the service manual • Select tools and equipment • Checking brake lights • Rectify brake lights defective components • Observe safety precautions • Clean tools, equipment, and work place • Store tools and equipment	Serviced brake lights function according to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure of servicing brake lights **Principles:** The student should explain the principles operations of servicing brake lights. • **Theories:** • The student should explain the rules of servicing brake lights. **Circumstantial**	The following tools, equipment and safety gears are to be available: • Vehicle • Wire brush • Tool kit • Multimetre • Safety clear glasses • Overall • Plastic gloves • Safety boots • Work bench • Gloves • Respiratory mask • Set of different wire connectors • Test lamp • Service manual • Clamp on meter • Soldering gun • AC/DC generator and	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						knowledge: **Detailed knowledge about:** • Safety precautions while servicing brake lights • Safe handling of work tools and equipment • Waste disposal	starter motor test bench • Spark plug service machine • Ignition coil tester • Oscilloscope • Electronic diagnosis equipment/tool	
		(e) Checking and servicing parking lights	**Brainstorming:** Guide students to brainstorm the parking lights and to explain the procedure for checking and servicing parking lights **Practical work:** Guide students on the various methods of checking and servicing	**The student should be able to:** • Interpret parking lights diagrams • Use the service manual • Select tools and equipment • Checking and servicing parking lights	Checked and serviced parking lights function according to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure of checking and servicing parking lights	The following tools, equipment and safety gears are to be available: • Vehicle • Wire brush • Tool kit • Multimetre • Safety clear glasses • Overall • Plastic gloves	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			parking lights **Practical activity:** Organise students in manageable groups for checking and servicing parking lights in the motor vehicle mechanic's workshop	• Rectify parking lights defective components • Observe safety precautions • Clean tools, equipment, and work place • Store tools and equipment		**Principles:** The student should explain the principles operations of checking and servicing parking lights • **Theories:** The student should explain the rules of checking and servicing parking lights **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while checking and servicing parking lights • Safe handling	• Safety boots • Work bench • Gloves • Respiratory mask • Set of different wire connectors • Test lamp • Service manual • Clamp on meter • Soldering gun • AC/DC generator and starter motor test bench • Spark plug service machine • Ignition coil tester • Oscilloscope • Electronic diagnosis equipment/tool •	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						of work tools and equipment • Waste disposal		
		(f) Checking and servicing reverse lights	**Brainstorming:** Guide students to brainstorm the reverse lights and identify methods of checking and servicing reverse lights **Practical work:** Guide students on the various methods of checking and servicing reverse lights **Practical activity:** Organise students in manageable groups for checking and servicing reverse lights in the motor vehicle mechanic's workshop	**The student should be able to:** • Interpret reverse lights diagrams Use the service manual • Select tools and equipment • Checking reverse lights • Rectify reverse lights defective components • Observe safety precautions • Clean tools, equipment, and work place • Store tools and equipment	Checked and serviced reverse lights function according to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure of checking and servicing reverse lights **Principles:** The student should explain the principles of checking and servicing reverse lights **Theories:** The student should explain the rules	The following tools, equipment and safety gears are to be available: • Vehicle • Wire brush • Tool kit • Multimetre • Safety clear glasses • Overall • Plastic gloves • Safety boots • Work bench • Gloves • Respiratory mask • Set of different wire connectors • Test lamp • Service manual • Clamp on meter	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						of checking and servicing parking lights **Circumstantial knowledge: Detailed knowledge about:** • Safety precautions while checking and servicing parking lights • Safe handling of work tools and equipment • Waste disposal	• Soldering gun • AC/DC generator and starter motor test bench • Spark plug service machine • Ignition coil tester • Oscilloscope. • Electronic diagnosis equipment/tool	
		(g) Checking and servicing Light Emitted Diodes lights (LED)	**Brainstorming:** Guide students to define Light Emitted Diodes lights (LED) and identify different types of Light Emitted Diodes lights	**The student should be able to:** • Interpret light Emitted Diodes lights (LED) diagrams	Checked and Serviced Light Emitted Diodes lights (LED)function according to	**Knowledge evidence: Detailed knowledge of:** **Method used:** The student should	The following tools, equipment and safety gears are to be available: • Vehicle • Wire brush	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			(LED) **Practical work:** Guide students on the various methods of checking and servicing Light Emitted Diodes lights (LED) **Practical activity:** Organise students in manageable groups for checking and servicing Light Emitted Diodes lights (LED)in the motor vehicle mechanic's workshop	• Use the service manual • Select tools and equipment • Checking LED light • Rectify lighting defective components • Observe safety precautions • Clean tools, equipment, and work place • Store tools and equipment	technical specifications	explain the procedure of Checking and Servicing Light Emitted Diodes lights **Principles:** The student should explain the principle operations of LED light • **Theories:** The student should explain the rules of checking and servicing Light Emitted Diodes lights (LED) **Circumstantial knowledge:** **Detailed knowledge about:** • Safety	• Tool kit • Multimetre • Safety clear glasses • Overall • Plastic gloves • Safety boots • Work bench • Gloves • Respiratory mask • Set of different wire connectors • Test lamp • Service manual • Clamp on meter • Soldering gun • AC/DC generator /Motor test bench • Spark plug service machine • Ignition coil tester • Oscilloscope • Electronic diagnosis	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						precautions while Checking and Service Light Emitted Diodes lights (LED) • Safe handling of work tools and equipment • Waste disposal	equipment/tool •	
	2.7 Servicing accessories circuits and components	(a) Checking and servicing horn circuit	**Brainstorming:** Guide students to brainstorm a horn circuit and identify different types of horn circuits **Practical work:** Guide students on the various methods of checking and servicing a horn circuit **Practical activity:** Organise students in	**The student should be able to:** • Select tools equipment and PPE • Interpret horn circuit diagrams • Use the service manual • Troubleshoot horn circuit components • Test horn circuit • Observe safety precautions • Clean tools,	Checked and serviced horn circuit functions as per vehicle manufacturer's specifications	**Knowledge evidence: Detailed knowledge of: Method used:** The student should explain the procedure of checking and service horn circuit **Principles:** The student should explain the	The following tools, equipment and safety gears are to be available: • Vehicle • Wire brush • Tool kit • Multimetre. • Safety clear glasses. • Overall • Plastic gloves • Safety boots • Work bench	31

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			manageable groups for checking and servicing a horn circuit in the motor vehicle mechanic's workshop	equipment, and work place • Store tools and equipment		principles of checking and servicing a horn circuit **Theories:** The student should explain the rules of checking and servicing a horn circuit **Circumstantial knowledge: Detailed knowledge about:** • Safety precautions while servicing horn circuits • Safe handling of work tools and equipment • Waste disposal	• Gloves • Respiratory mask • Multimetre • Set of different wire connectors • Test lamp • Service manual • Clamp on meter • Wire brush • Soldering gun • AC/DC generator and starter motor test bench • Spark plug service machine • Ignition coil tester • Oscilloscope • Electronic diagnosis equipment/tool	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						•		
		(b) Checking and servicing wiper and windscreen washer circuit	**Brainstorming:** Guide students to brainstorm a wiper and windscreen washer circuit and identify types of wipers and windscreen washer circuits **Practical work:** Guide students on the various methods of checking and servicing wiper and windscreen washer circuit) **Practical activity:** Organise students in manageable groups for checking and servicing wiper and windscreen washer circuit in the motor vehicle mechanic's workshop	**The student should be able to:** • Select tools equipment and PPE • Interpret wiper and windscreen washer circuit diagrams • Use the service manual • Troubleshoot wiper and windscreen washer circuit components • Test wiper and windscreen washer circuit • Observe safety precautions • Clean tools, equipment, and work place • Store tools and equipment	Checked and serviced wiper and windscreen washer circuit functions as per vehicle manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** • **Method used:** The student should explain the procedure of checking and servicing a wiper and windscreen washer circuit **Principles:** The student should explain the principles of checking and servicing a wiper and windscreen washer circuit **Theories:** The student should explain the rules of checking and	The following tools, equipment and safety gears are to be available: • Vehicle • Wire brush • Tool kit • Multimetre • Safety clear glasses • Overall • Plastic gloves • Safety boots • Work bench • Gloves • Respiratory mask • Multimetre • Set of different wire connectors • Test lamp • Service manual • Clamp on meter • Soldering gun • AC/DC	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						servicing a wiper and windscreen washer circuit **Circumstantial knowledge:** **Detailed knowledge about:** • Observe safety precautions • Safe handling of work tools and equipment	generator and starter motor test bench • Spark plug service machine • Ignition coil tester • Oscilloscope • Electronic diagnosis equipment/tool	
		(c) Checking and servicing defogger circuits	**Brainstorming:** Guide students to brainstorm defogger circuits and identify different types of defogger circuits **Practical work:** Guide students on the various methods of checking and servicing defogger circuits **Practical activity:**	**The student should be able to:** • Select tools equipment and PPE • Interpret defogger circuits diagrams • Use the service manual • Troubleshoot defogger circuits components • Test defogger circuits	Checked and serviced defogger circuit functions as per vehicle manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** • **Method used:** The student should explain the procedure of checking and servicing defogger circuits **Principles:** The	The following tools, equipment and safety gears are to be available: • Vehicle • Wire brush • Tool kit • Multimetre • Safety clear glasses • Overall • Plastic gloves • Safety boots • Work bench	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Organise students in manageable groups for checking and servicing defogger circuits in the motor vehicle mechanic's workshop	• Observe safety precautions • Clean tools, equipment, and work place • Store tools and equipment		student should explain the principles of checking and servicing defogger circuits **Theories:** The student should explain the rules of checking and servicing defogger circuits **Circumstantial knowledge: Detailed knowledge about:** •Observe safety precautions •Safe handling of work tools and equipment	• Gloves • Respiratory mask • Multimetre • Set of different wire connectors • Test lamp • Service manual • Clamp on meter • Soldering gun • AC/DC generator and starter motor test bench • Spark plug service machine • Ignition coil tester • Oscilloscope • Electronic diagnosis equipment/tool	
		(d) Checking and servicing headlamp and wiper	**Brainstorming:** Guide students to brainsorm a headlamp wiper and identify different types of headlamp wipers	**The student should be able to:** • Select tools equipment and PPE • Interpret headlamp and wiper • Use the service	Checked and serviced defogger circuit functions as per the vehicle manufacturer's specifications	**Knowledge evidence: Detailed knowledge of:** • **Method used:** The student should explain	The following tools, equipment and safety gears are to be available: • Vehicle • Wire brush • Tool kit	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Practical work: Guide students on the various methods of checking and servicing a headlamp wiper **Practical activity:** Organise students in manageable groups for checking and servicing headlamp wipers in the motor vehicle mechanic's workshop	manual • Troubleshoot headlamp and wiper components • Test headlamp and wiper • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment		the procedure of checking and servicing headlamp and wiper **Principles:** The student should explain the principles of checking and servicing headlamp and wiper **Theories:** The student should explain the rules of testing head lamp and wiper **Circumstantial knowledge:** **Detailed knowledge** **Observe safety precautions.** • Observe safety precautions • Safe handling of work tools	• Multimetre • Safety clear glasses. • Overall • Plastic gloves • Safety boots • Work bench • Gloves • Respiratory mask • Set of different wire connectors • Test lamp • Service manual. • Clamp on meter. • Soldering gun • AC/DC generator and starter motor test bench • Spark plug service machine • Ignition coil tester • Oscilloscope • Electronic diagnosis equipment/tool	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						and equipment		
3.0 Maintaining suspension system	3.1 Replacing suspension bushes	(a) Replacing spring bushes	**Brainstorming:** Guide students to define spring bushes and identify different types of spring bushes **Practical work:** Guide students on the various methods of replacing spring bushes **Practical activity:** Organise students in manageable groups to replace spring bushes in the motor vehicle mechanic's workshop	**The student should be able to:** • Select tools and equipment • Locate defective spring brushes • Replace rubber/brass/steel brushes • Replace spring brushes • Observe safety precautions • Clean, tools, equipment, and place-workplace • Store tools and equipment	Serviced spring bushes conform to manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure of replacing spring bushes **Principles:** The student should explain the principles of replacing spring bushes **Theories:** The student should explain the rules of replacing spring bushes **Circumstantial**	The following tools, equipment and safety gears are to be available: • Tool kit • Jack • Vehicle • Stop blocks/wedges • Wire brush • Tyre lever • Drift/round punch • Wheel spanner • Set of pullers • Safety boot • Gloves • Safety stand • Helmet • Overall • Safety clear glasses	55

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						knowledge: **Detailed knowledge about:** • Observe safety precautions • Safe handling of work tools and equipment		
		(b) Replacing stabilizer bushes	**Brainstorming:** Guide students to define stabilizer bushes and identify different types of stabilizer bushes **Practical work:** Guide students on the various methods of replacing stabilizer bushes **Practical activity:** Organise students in manageable groups to replace stabilizer bushes	**The student should be able to:** • Select tools and equipment • Locate defective stabilizer bushes • Replace rubber/brass/steel/stabilizer brushes • Replace stabilizer bushes • Observe safety precautions • Clean tools, equipment, and workplace	Serviced stabilizer bushes conform to manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure of replacing stabilizer bushes **Principles:** The student should explain the principles of replacing stabilizer	This unit can be achieved at a work place or training institution. The following tools, equipment and safety gears are to be available: • Tool kit • Jack • Vehicle • Stop blocks/wedges • Wire brush • Tyre lever • Drift/round	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			in the motor vehicle mechanic's workshop	• Store tools and equipment		bushes **Theories:** The student should explain the rules of replacing stabilizer bushes **Circumstantial knowledge:** **Detailed knowledge about:** • Observe safety precautions • Safe handling of work tools and equipment	punch • Wheel spanner • Set of pullers • Safety boot • Gloves • Safety stand • Helmet • Overall • Safety clear glasses	
	3.2 Replacing suspension shock absorbers	(a) Replacing telescopic shock absorber	**Brainstorming:** Guide students to define telescopic shock absorbers and identify different types of telescopic shock absorbers	**The student should be able to:** • Select tools and equipment • Replace the telescopic shock absorber	Replaced telescopic shock absorber functions as per manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the	The following tools, equipment and safety gears are to be available: • Tool kit • Jack • Vehicle with	50

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Practical work: Guide students on the various methods of replacing telescopic shock absorbers **Practical activity:** Organise students in manageable groups to replace telescopic shock absorbers in the motor vehicle mechanic's workshop	• Test shock absorber function ability • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment		procedure for replacing the telescopic shock absorber **Principles:** The student should explain the principles of replacing telescopic shock absorber **Theories:** The student should explain the rules of replacing telescopic shock absorber absorbers **Circumstantial knowledge:** **Detailed knowledge about:** • Observe safety precautions • Safe handling of work tools and	shock absorber • Safety stand • Stop blocks/wedges • Wire brush • Mallet/rubber hammer • Ruler • Round punch • Safety boots • Overalls • Gloves • Safety clear glass • Helmet	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						equipment		
		(b) Replacing McPherson strut shock absorber	**Brainstorming:** Guide students to describe the McPherson strut shock absorbers and identify different types of McPherson strut shock absorbers **Practical work:** Guide the students on the various methods of replacing the McPherson strut shock absorber **Practical activity:** Organise the students in manageable groups to replace McPherson strut shock absorber in the motor vehicle mechanic's workshop	**The student should be able to:** • Select tools and equipment • Replace McPherson strut shock absorber • Test McPherson strut shock absorber function ability • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment	Replaced McPherson strut shock absorber functions as per manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure of replacing the McPherson strut shock absorber **Principles:** The student should explain the principles of replacing the McPherson strut shock absorber **Theories:** The student should explain the rules of replacing the McPherson strut shock absorber **Circumstantial knowledge:** **Detailed**	The following tools, equipment and safety gear are to be available: • Tool kit • Jack • Vehicle with shock absorber • Safety stand • Stop blocks/wedges • Wire brush • Mallet/rubber hammer • Ruler • Round punch • Safety boots • Overalls • Gloves • Safety clear glass • Helmet	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						knowledge about: • Observe safety precautions • Safe handling of work tools and equipment		
	3.3 Troubleshooting air suspensions	(a) Trouble-shooting pneumatic suspension components	**Brainstorming:** Guide students to describe the concept of troubleshooting pneumatic suspension components and identify different pneumatic suspension components **Practical work:** Guide students on the various methods of troubleshooting pneumatic suspension components **Practical activity:** Organise students in manageable groups for	**The student should be able to:** • Select tools and equipment • Check air suspension components • Check lubricants • Analyse functions and performance of air accumulators • Inspect pneumatic suspension components • Observe safety precautions • Clean tools, equipment, and workplace	Serviced air suspension system conforms to the manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure of troubleshooting pneumatic suspension components **Principles:** The student should explain the principles of troubleshooting pneumatic suspension	The following tools, equipment, and safety gears are to be available: • Service manual • Vehicle with air suspension system • Jacks • Service pit • Hoist • Sling • Tool kit • Tyre levers • Hammer • Air compressor • Air leakage detector • Safety boots	57

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			troubleshooting pneumatic suspension components in the motor vehicle mechanic's workshop	• Store tools, equipment, and parts		components **Theories:** The student should explain the rules of troubleshooting the pneumatic suspension component **Circumstantial knowledge:** **Detailed knowledge about:** • Observe safety precautions • Safe handling of work tools and equipment	• Overall • Safety helmet • Safety clear glasses • Gloves	
		(b) Diagnosing electronic suspension components	**Brainstorming:** Guide students to explain the concept of diagnosing electronic suspension components and identify different types of electronic suspension components	**The student should be able to:** • Select tools and equipment • Check electronic suspension components • Analyse functions	Diagnosed electronic suspension components conform to the manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure for diagnosing	The following tools, equipment and safety gears are to be available: • Service manual • Vehicle with air suspension system	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Practical work: Guide students on the various methods of diagnosing electronic suspension components **Practical activity:** Organise students in manageable groups to diagnose electronic suspension components in the motor vehicle mechanic's workshop	and performance of electronic suspension components • Inspect electronic suspension components • Observe safety precautions • Clean tools, equipment, and workplace • Store tools, equipment, and parts		electronic suspension components **Principles:** The student should explain the principles of diagnosing electronic suspension components **Theories:** The student should explain the rules of diagnosing electronic suspension components **Circumstantial knowledge:** **Detailed knowledge about:** • Observe safety precautions • Safe handling of work tools	• Jacks • Service pit • Hoist • Sling • Tool kit • Tyre levers • Hammer • Air compressor • Air leakage detector • Safety boots • Overall • Safety helmet • Safety clear glasses • Gloves	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						and equipment		
		(c) Testing electronic suspension system	**Brainstorming:** Guide students to define electronic suspension systems and identify different types of electronic suspension systems **Practical work:** Guide students on the various methods of testing the electronic suspension system **Practical activity:** Organise students in manageable groups for testing the electronic suspension system in the motor vehicle mechanic's workshop	**The student should be able to:** • Select tools and equipment Check electronic suspension system, functions, and performance • Inspect electronic suspension components • Observe safety precautions • Clean tools, equipment, and workplace • Store tools, equipment, and parts	Tested electronic suspension system conforms to manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure of testing electronic suspension system **Principles:** The student should explain the principles of testing electronic suspension system **Theories:** The student should explain the rules of testing the electronic suspension system **Circumstantial knowledge:** **Detailed knowledge about:**	The following tools, equipment and safety gears are to be available: • Service manual • Vehicle with air suspension system • Jacks • Service pit • Hoist • Sling • Tool kit • Tyre levers • Hammer • Air compressor • Air leakage detector • Safety boots. • Overall • Safety helmet • Safety clear glasses • Gloves	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						• Observe safety precautions • Safe handling of work tools and equipment		
	3.4 Servicing air (pneumatic) suspension components	(a) Repairing pneumatic suspension components	**Brainstorming:** Guide students to explain the concept of pneumatic suspension components and identify different types of pneumatic suspension components **Practical work:** Guide students on the various methods of repairing pneumatic suspension components **Practical activity:** Organise students in manageable groups for repairing pneumatic suspension components in the motor vehicle mechanic's workshop	**The student should be able to:** • Use the service manual • Select tools and use service manuals • Replace the air spring to the suspension • Service air ride levelling valve • Perform refilling of air cylinders • Service electronic components of electronic levelling/ride control • Replace shock absorbers • Refit shock	Repaired pneumatic suspension components conform to the manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** • **Method used:** The student should explain the procedure of repairing pneumatic suspension components • **Principles:** The student should explain the principles of repairing the pneumatic suspension components	The following tools, equipment and safety gear are to be available: • Vehicle chassis with air suspension system • Service manual • Jack • Service pit • Tool kit • Multimetre • Tyre levers • Hammer • Air compressor • Sling and hoist • Wheel spanner • Set of Pullers • Wheel blocks	55

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				absorbers • Service air accumulators as required • Align chassis • Observe safety precautions • Clean tools, equipment, and workplace • Store tools, equipment, and parts		**Theories:** The student should explain the rules of repairing pneumatic suspension components **Circumstantial knowledge:** **Detailed knowledge about:** • Observe safety precautions • Safe handling of work tools and equipment	• Air leakage detector • Gas chargers • Chassis alignment jig. • Safety boots • Helmet • Overalls • Gloves • Safety clear glasses	
		(b) Repairing electronic suspension components	**Brainstorming:** Guide students to brainstorm the concept of electronic suspension components and identify different types of electronic suspension components **Practical work:** Guide students on the	**The student should be able to:** • Use the service manual • Select tools and service manuals • Replace electronic suspension components • Service air ride levelling valve	Repaired electronic suspension components conform to the manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** • **Method used:** The student should explain the procedure of repairing electronic suspension	The following tools, equipment and safety gears are to be available: • Vehicle chassis with air suspension system • Service manual • Jack • Service pit	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			various methods of repairing electronic suspension components **Practical activity:** Organise students in manageable groups to repair electronic suspension components in the motor vehicle mechanic's workshop	• Service electronic components of electronic levelling/ride control • Replace the shock absorbers • Refit the shock absorbers • Service the air accumulators as required • Align the chassis • Observe safety precautions • Clean tools, equipment, and workplace • Store tools, equipment, and parts		components • **Principles:** The student should explain the principles of repairing electronic suspension components **Theories:** The student should explain the rules of Repairing electronic suspension components **Circumstantial knowledge:** **Detailed knowledge about:** • Observe safety precautions • Safe handling of work tools and equipment	• Tool kit • Multimetre • Tyre levers • Hammer • Air compressor • Sling and hoist • Wheel spanner • Set of Pullers • Wheel blocks • Air leakage detector • Gas chargers • Chassis alignment jig • Safety boots • Helmet • Overalls • Gloves • Safety clear glasses	
		(c) Performing chassis alignment	**Brainstorming:** Guide students to define chassis alignment and identify different types of	**The student should be able to:** • Use the service manual	Performed chassis alignment conforms to the manufacturer's	**Knowledge evidence:** **Detailed knowledge of:**	The following tools, equipment and safety gear are to be available:	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			chassis alignment **Practical work:** Guide students on the various methods of performing chassis alignment **Practical activity:** Organise students in manageable groups to perform chassis alignment in the motor vehicle mechanic's workshop	• Select tools and service manuals • Service chassis alignment • Replace chassis alignment • Align chassis • Observe safety precautions • Clean tools, equipment, and workplace • Store tools, equipment, and parts	specifications	• **Method used:** The student should explain the procedure of performing chassis alignment • **Principles:** The student should explain the principles of performing chassis alignment **Theories:** The student should explain the rules of performing chassis alignment **Circumstantial knowledge:** **Detailed knowledge about:** • Observe safety precautions • Safe handling of work tools and equipment	• Vehicle chassis with air suspension system • Service manual • Jack • Service pit • Tool kit • Multimetre • Tyre levers • Hammer • Air compressor • Sling and hoist • Wheel spanner • Set of Pullers • Wheel blocks • Air leakage detector • Gas chargers • Chassis alignment jig • Safety boots • Helmet • Overalls • Gloves • Safety clear glasses	
4.0 Maintaining	4.1 Servicing	(a) Servicing	**Brainstorming:**	**The student should be**	Serviced master	**Knowledge**	The following tools,	42

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
brake system	hydraulic brake system components	brake master cylinder	Guide students to define brake master cylinders and identify different types of brake master cylinders **Practical work:** Guide students on the various methods of servicing brake master cylinder **Practical activity:** Organise students in manageable groups for service brake master cylinder in the motor vehicle mechanic's workshop	**able to:** • Use the service manual • Select tools and equipment • Service master cylinder • Test brakes master cylinder • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment	cylinder functions according to manufacturer's specifications	**evidence:** **Detailed knowledge of:** • **Method used:** The student should explain the procedure of servicing the brake master cylinder **Principles:** The student should explain the principles of servicing the brake master cylinder **Theories:** The student should explain the rules of servicing the brake master cylinder **Circumstantial knowledge:** **Detailed knowledge about:** • Observe	equipment and safety gears are to be available: • Vehicle with hydraulic brake system • Service manual • Tool kit • Work bench • Bench vice • Wheel blocks/wedges • Covering blankets • Bleeding container and transparent pipe • Pressure hydraulic brake bleeder • Long nose pliers • Automated tube shouldering-making machine • Gloves	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						safety precautions • Safe handling of work tools and equipment	• Overall • Safety boots • Safety clear glass	
		(b) Servicing a wheel cylinder	**Brainstorming:** Guide students to define a wheel cylinder and identify different types of wheel cylinder **Practical work:** Guide students on the various methods of servicing a wheel cylinder **Practical activity:** Organise students in manageable groups for servicing a wheel cylinder in the motor vehicle mechanic's workshop	**The student should be able to:** • Use the service manual • Select tools and equipment • Service wheel cylinder • Test brake wheel cylinder • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment	Serviced brake wheel cylinder functions according to manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** • **Method used:** The student should explain the procedure of servicing a brake wheel cylinder **Principles:** The student should explain the principles of servicing a brake wheel cylinder **Theories:** The student should explain the rules	The following tools, equipment and safety gear are to be available: • Vehicle with hydraulic brake system • Service manual • Tool kit • Workbench • Bench vice • Wheel blocks/wedges • Covering blankets • Bleeding container and transparent pipe • Pressure hydraulic brake	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						of servicing a brake wheel cylinder **Circumstantial knowledge:** **Detailed knowledge about:** • Observe safety precautions • Safe handling of work tools and equipment	bleeder • Long nose pliers • Automated tube shouldering-making machine • Gloves • Overall • Safety boots • Safety clear glass	
		(c) Servicing brake booster	**Brainstorming:** Guide students to define a brake booster and identify different types of brake boosters **Practical work:** Guide students on the various methods of servicing a brake booster **Practical activity:** Organise students in manageable groups for	**The student should be able to:** • Use the service manual • Select tools and equipment • Service the brake booster • Test the brake booster • Observe safety precautions • Clean tools,	Serviced brake booster functions according to manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** • **Method used:** The student should explain the procedure of servicing a brake booster **Principles:** The student should explain the	The following tools, equipment and safety gears are to be available: • Vehicle with hydraulic brake system • Service manual • Tool kit • Work bench • Bench vice • Wheel blocks/wedges	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			servicing a brake booster in the motor vehicle mechanic's workshop	equipment, and place-workplace • Store tools and equipment		principles of servicing a brake booster **Theories:** The student should explain the rules of servicing the brake booster **Circumstantial knowledge:** **Detailed knowledge about:** • Observe safety precautions • Safe handling of work tools and equipment	• Covering blankets • Bleeding container and transparent pipe • Pressure hydraulic brake bleeder • Long nose pliers • Automated tube shouldering-making machine • Gloves • Overall • Safety boots • Safety clear glass	
		(d) Repairing brake fluid pipes	**Brainstorming:** Guide the students to describe the brake fluid pipes and identify different types of brake fluid pipes	**The student should be able to:** • Use the service manual • Select tools and equipment	Repaired brake fluid pipes function according to manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** • **Method used:** The student	The following tools, equipment and safety gear are to be available: • Vehicle with hydraulic brake	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Practical work: Guide students on the various methods of repairing brake fluid pipes **Practical activity:** Organise the students in manageable groups to repair brake fluid pipes in the motor vehicle mechanic's workshop	• Repairing brake fluid pipes • Test brake fluid pipes • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment		should explain the procedure for repairing brake fluid pipes **Principles:** The student should explain the principles of repairing brake fluid pipes **Theories:** The student should explain the rules of repairing brake fluid pipes **Circumstantial knowledge:** **Detailed knowledge about:** • Observe safety precautions • Safe handling of work tools and equipment	system • Service manual • Tool kit • Workbench • Bench vice • Wheel blocks/wedges • Covering blankets • Bleeding container and transparent pipe • Pressure hydraulic brake bleeder • Long nose pliers • Automated tube shouldering making machine • Gloves • Overall • Safety boots • Safety clear glass	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
		(e) Performing air bleeding	**Brainstorming:** Guide students to brainstorm the air bleeding and identify different types of air bleeding **Practical work:** Guide students on the various methods of performing air bleeding **Practical activity:** Organise students in manageable groups for performing air bleeding in the motor vehicle mechanic's workshop	**The student should be able to:** • Use the service manual. • Select tools and equipment • Perform bleeding • Test brakes • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment	Performed air bleeding functions according to manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** • **Method used:** The student should explain the procedure of performing air bleeding **Principles:** The student should explain the principles of performing air bleeding **Theories:** The student should explain the rules of performing air bleeding **Circumstantial knowledge:** **Detailed knowledge about:** • Observe	The following tools, equipment and safety gears are to be available: • Vehicle with hydraulic brake system • Service manual • Tool kit • Workbench • Bench vice • Wheel blocks/wedges • Covering blankets • Bleeding container and transparent pipe • Pressure hydraulic brake bleeder • Long nose pliers • Automated tube shouldering-making	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						safety precautions. • Safe handling of work tools and equipment	machine • Gloves • Overall • Safety boots • Safety clear glass	
	4.2 Servicing drum brakes	(a) Checking brake drum	**Brainstorming:** Guide the students to describe the brake drum and identify types of brake drum **Practical work:** Guide the students on the various methods of checking brake drum **Practical activity:** Organise the students in manageable groups to check the brake drum in the motor vehicle mechanic's workshop	**The student should be able to:** • Use the service manual • Select tools and equipment • Dismantle the drum brakes • Inspect the drum brake components • Service the drum brake components • Perform brake adjustment • Observe safety precautions • Clean tools,	The serviced drum brake conforms to the manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure of checking the brake drum **Principles:** The student should explain the principles of checking the brake drum **Theories:** The student should explain the rules of checking the	The following tools, equipment and safety gear are to be available: • Vehicle with drum brakes • Brake spring tool (SST) • High-pressure bleeder • Jack • Wheel blocks • Tool kit • Service manual • Hoist or service pit • Covering blanket • Air compressor • Tyre lever	32

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				equipment, and workplace • Store tools and equipment		brake drum **Circumstantial knowledge:** **Detailed knowledge about:** • Observe safety precautions • Safe handling of work tools and equipment	• Plastic hammer • Brake shoes riveter machine • Water container • Anvil • Safety stands • Wire brush • Wheel spanner • Hand/bench/drilling machine • Rivet head punches • G/Clamps • Masks • Goggles • Overall • Safety boots • Safety clear glasses	
		(b) Relining drum brake shoes	**Brainstorming:** Guide the students to define a drum brake shoe and identify different types of drum brake shoes **Practical work:** Guide the students on the	**The student should be able to:** • Use the service manual • Select tools and equipment • Check drum brake shoes • Inspect drum brake	Serviced drum brake shoes conform to the manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure of checking brake	The following tools, equipment and safety gear are to be available: • Vehicle with drum brakes • Brake spring tool (SST) • High-pressure bleeder • Jack	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			various methods of relining drum brake shoes **Practical activity:** Organise the students in manageable groups for relining drum brake shoes in the motor vehicle mechanic's workshop	shoe components • Service drum brake shoe components. • Reline braked rum shoes • Observe safety precautions • Clean tools, equipment, and work place • Store tools and equipment		drum shoes **Principles:** The student should explain the principles of checking brake drum shoes **Theories:** The student should explain the rules of checking brake drum shoes **Circumstantial knowledge:** **Detailed knowledge about:** • Observe safety precautions • Safe handling of work tools and equipment	• Wheel blocks • Tool kit • Service manual • Hoist or service pit • Covering blanket • Air compressor • Tyre lever • Plastic hammer • Brake shoes riveter machine • Water container • Anvil • Safety stands • Wire brush • Wheel spanner • Hand/bench/drilling machine • Rivet head punches • G/Clamps • Masks • Goggles • Overall • Safety boots • Safety clear glasses	
		(c) Adjusting	**Brainstorming:**	**The student should be**	Adjusted brakes	**Knowledge**	The following tools,	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
		brakes	Guide the students to explain the concept of adjusting brakes and identify the methods for adjusting brakes **Practical work:** Guide the students on the various methods of adjusting brakes **Practical activity:** Organise the students in manageable groups for adjusting brakes in the motor vehicle mechanic's workshop	**able to:** • Use the service manual • Select tools and equipment • Check brakes • Inspect the brake components • Service the brakes • Adjust the brakes • Observe safety precautions • Clean tools, equipment, and work place • Store tools and equipment	conform to manufacturer's specifications	**evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure of Adjusting brakes **Principles:** The student should explain the principles of adjusting brakes **Theories:** The student should explain the rules of adjusting brakes **Circumstantial knowledge:** **Detailed knowledge about:** • Observe safety precautions • Safe handling of work tools and equipment	equipment. and safety gears are to be available: • Vehicle with drum brakes • Brake spring tool (SST) • High pressure bleeder • Jack • Wheel blocks • Tool kit • Service manual • Hoist or service pit • Covering blanket • Air compressor • Tyre lever • Plastic hammer • Brake shoes riveter machine • Water container • Anvil • Safety stands • Wire brush • Wheel spanner.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
							• Hand/bench/drilling machine • Rivet head punches • G/Clamps • Masks • Goggles • Overall • Safety boots • Safety clear glasses	
		(d) Removing air from the system	**Brainstorming:** Guide the students to explain the principles of removing air from the system and identify different methods of removing air from the system **Practical work:** Guide the students on the various methods of removing air from the system	**The student should be able to:** • Use the service manual • Select tools and equipment • Check the air from the system • Inspect air from the system components • Service air components • Observe safety precautions • Clean tools,	Removed air from the system conforms to the manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure of removing air from the system **Principles:** The student should explain the principles of removing air from	The following tools, equipment and safety gears are to be available: • Vehicle with drum brakes • Brake spring tool (SST) • High-pressure bleeder • Jack • Wheel blocks • Tool kit • Service manual • Hoist or service pit	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Practical activity: Organise the students in manageable groups to remove air from the system in the motor vehicle mechanic's workshop	equipment, and workplace • Store tools and equipment		the system **Theories:** The student should explain the rules of removing air from the system **Circumstantial knowledge:** **Detailed knowledge about:** • Observe safety precautions • Safe handling of work tools and equipment	• Covering blanket • Air compressor • Tyre lever • Plastic hammer • Brake shoes riveter machine • Water container • Anvil • Safety stands • Wire brush • Wheel spanner • Hand/bench/drilling machine • Rivet head punches • G/Clamps • Masks • Goggles • Overall • Safety boots • Safety clear glasses	
		(e) Performing facing of brake drums	**Brainstorming:** Guide the students to define the facing of brake drums and identify different methods of performing the facing of	**The student should be able to:** • Use the service manual • Select tools and equipment	Performed facing of brake drums conform to manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should	The following tools, equipment and safety gear are to be available: • Vehicle with drum brakes	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			brake drums **Practical work:** Guide the students on the various methods of performing facing of brake drums **Practical activity:** Organise the students in manageable groups to perform facing of brake drums in the motor vehicle mechanic's workshop	• Check brake drum worn out • Inspect the brake drum • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment		explain the procedure of performing the facing of brake drums **Principles:** The student should explain the principles of performing facing of brake drums **Theories:** The student should explain the rules of performing facing of brake drums **Circumstantial knowledge:** **Detailed knowledge about:** • Observe safety precautions • Safe handling of work tools and equipment	• Brake spring tool (SST) • High-pressure bleeder • Jack • Wheel blocks. • Tool kit • Service manual • Hoist or service pit • Covering blanket • Air compressor • Tyre lever • Plastic hammer • Brake shoes riveter machine • Water container • Anvil • Safety stands • Wire brush • Wheel spanner • Hand/bench/drilling machine • Rivet head punches • G/Clamps	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
							• Masks • Goggles • Overall • Safety boots • Safety clear glasses	
	4.3 Servicing disc brakes	(a) Replacing brake pads	**Brainstorming:** Guide the students to brainstorm the brake pads and identify types of brake pads **Practical work:** Guide the students on the various methods of replacing brake pads **Practical activity:** Organise the students in manageable groups to replace brake pads in the motor vehicle mechanic's workshop	**The student should be able to:** • Use the service manual • Select tools and equipment • Replace the brake pads • Bleed the brakes • Test the brakes • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment	Replaced brake pads conform to the manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure for replacing brake pads **Principles:** The student should explain the principles of replacing brake pads **Theories:** The student should explain the rules	The following tools, equipment and safety gear are to be available: • Vehicle with disc brakes • Service manual • Tool kit • Wheel spanner • Jack • Wheel blocks • Brake disc lathe • Micrometre • Wooden block • Vernier calliper • Air compressor • Bleeding equipment/tools	27

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						of replacing brake pads **Circumstantial knowledge:** **Detailed knowledge about:** • Observe safety precautions • Safe handling of work tools and equipment	• Service pit/hoist • Safety stands • Overall • Safety boots • Gloves • Safety clear glasses	
		(b) Repairing brake calliper	**Brainstorming:** Guide the students to define a brake calliper and identify types of brake callipers **Practical work:** Guide the students on the various methods of repairing a brake calliper **Practical activity:** Organise the students in manageable groups to	**The student should be able to:** • Use the service manual • Select tools and equipment • Repair the disc brake calliper • Bleed the brakes • Test the brakes • Observe safety precautions • Clean tools, equipment, and	The replaced brake calliper conforms to the manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure of repairing a brake calliper **Principles:** The student should explain the principles of	The following tools, equipment and safety gear are to be available: • Vehicle with brake calliper • Service manual • Tool kit • Wheel spanner • Jack • Wheel blocks • Brake disc lathe • Micrometre • Wooden block	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			repair a brake calliper in the motor vehicle mechanic's workshop	workplace • Store tools and equipment		repairing the brake calliper **Theories:** The student should explain the rules of repairing the brake calliper **Circumstantial knowledge:** **Detailed knowledge about:** • Observe safety precautions • Safe handling of work tools and equipment	• Vernier calliper • Air compressor • Bleeding equipment/tools • Service pit/hoist • Safety stands • Overall • Safety boots • Gloves • Safety clear glasses	
		(c) Performing facing of the disc	**Brainstorming:** Guide the students to define the facing of the disc and identify the methods of disc-facing **Practical work:** Guide the students on the various methods of	**The student should be able to:** • Use the service manual • Select tools and equipment • Check the facing of the disc • Perform the facing	The performed facing of the disc conforms to the manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure	The following tools, equipment and safety gear are to be available: • Vehicle with disc brakes • Service manual • Tool kit • Wheel spanner	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			performing facing of the disc **Practical activity:** Organise the students in manageable groups to perform facing of the disc in the motor vehicle mechanic's workshop	of the disc • Test the disc • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment		of performing facing of the disc **Principles**: The student should explain the principles of performing facing of the disc **Theories:** The student should explain the rules of performing facing of the disc • Causes of disc brake failures and their remedies **Circumstantial knowledge:** **Detailed knowledge about:** • Observe safety precautions	• Jack • Wheel blocks • Brake disc lathe • Micrometre • Wooden block • Vernier calliper • Air compressor • Bleeding equipment/tools • Service pit/hoist • Safety stands • Overall • Safety boots • Gloves • Safety clear glasses	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						• Safe handling of tools, equipment, and materials		
	4.4 Servicing anti-lock brake system (ABS)	(a) Troubleshooting ABS faults	**Brainstorming:** Guide the students to define troubleshooting ABS faults and identify various methods of troubleshooting ABS faults **Practical work:** Guide the students on the various methods of troubleshooting ABS faults **Practical activity:** Organise the students in manageable groups to troubleshoot ABS faults in the motor vehicle mechanic's workshop	**The student should be able to:** • Select tools and equipment • Check faulty components • Repair defective components • Test ABS brake system operation • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment	Serviced anti-lock brake system functions according to technical specifications	**Knowledge evidence: Detailed knowledge of: Method used:** The student should explain the procedure of servicing the anti-lock brake system **Principles:** The student should explain the principles of servicing anti-lock brake system (ABS) **Theories:** The student should explain the rules of servicing anti-lock brake system	The following tools, equipment and safety gears are to be available: • Vehicle • Electrical bench • Spanner kits • Set of pliers • Digital Multimetre • Test lamp • Screw driver set • Over coat • Safety boots • Safety glass • Gloves	24

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						Circumstantial knowledge **Detailed knowledge about:** • Observe safety precautions • Safe handling of work tools and equipment		
		(b) Servicing ABS components	**Brainstorming:** Guide the students to explain the concept related to ABS components and identify the methods of servicing ABS components **Practical work:** Guide the students on the various methods of servicing ABS components **Practical activity:** Organise the students in manageable groups for servicing ABS	**The student should be able to:** • Select tools and equipment • Check faulty components • Repair defective components • Test ABS brake system operation • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and	Serviced anti-lock brake system components function according to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used**: The student should explain the procedure of servicing anti-lock brake system **Principles**: The student should explain the principles of servicing anti-lock brake system	The following tools, equipment and safety gears are to be available: • Vehicle • Electrical bench • Spanner kits • Set of pliers • Digital Multimetre • Test lamp • Screw driver set • Over coat • Safety boots • Safety glass • Gloves	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			components in the motor vehicle mechanic's workshop	equipment		**Theories**: The student should explain the rules of servicing anti-lock brake system **Circumstantial knowledge** **Detailed knowledge about**: • Observe Safety precautions • Safe handling of work tools and equipment		
		(c) Servicing automatic traction control	**Brainstorming:** Guide the students to brainstorm the concept related to automatic traction control and identify the methods for servicing automatic traction control **Practical work:** Lead the student on the	**The student should be able to:** • Select tools and equipment • Check faulty components • Repair defective components • Test automatic traction control • Observe safety	Serviced automatic traction control functions according to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used**: The student should explain the procedure of automatic traction control **Principles**: The	The following tools, equipment and safety gear are to be available: • Vehicle • Electrical bench • Spanner kits • Set of pliers • Digital Multimetre • Test lamp	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			various methods of servicing automatic traction control **Practical activity:** Organise the students in manageable groups for servicing automatic traction control in the motor vehicle mechanic's workshop	precautions • Clean tools, equipment, and workplace • Store tools and equipment		student should explain the principles of servicing automatic traction control **Theories**: The student should explain the rules of servicing automatic traction control **Circumstantial knowledge** **Detailed knowledge about**: • Observe Safety precautions • Safe handling of work tools and equipment	• Screwdriver set • Overcoat • Safety boots • Safety glass • Gloves	
		(d) Programming ABS modulato	**Brainstorming:** Guide the students to explain the concept of programming an ABS	**The student should be able to:** • Select tools and equipment	Programmed ABS modulator control functions according to technical	**Knowledge evidence:** **Detailed knowledge of:**	The following tools, equipment and safety gears are to be available:	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
		r	modulator and identify different methods of programming an ABS modulator. **Practical work:** Lead the students on the various methods of programming the ABS modulator **Practical activity:** Organise the students in manageable groups for programming ABS modulator in the motor vehicle mechanic's workshop	• Check the faulty components • Repair the defective components • Test the ABS modulator • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment	specifications	**Method used**: The student should explain the procedure of programming ABS modulator **Principles**: The student should explain the principles of programming ABS modulator **Theories**: The student should explain the rules of programming ABS modulator **Circumstantial knowledge** **Detailed knowledge about**: • Observe safety precautions • Safe handling of work tools and equipment	• Vehicle • Electrical bench • Spanner kits • Set of pliers • Digital Multimetre • Test lamp • Screwdriver set • Overcoat • Safety boots • Safety glass • Gloves	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
	4.5 Servicing pneumatic brakes	(a) Servicing brake pads	**Brainstorming:** Guide the students to define brake pads and identify different types of brake pads **Practical work:** Lead the students on the various methods of servicing brake pads **Practical activity:** Organise the students in manageable groups for servicing brake pads in the motor vehicle mechanic's workshop	**The student should be able to:** • Use the service manual • Select tools and equipment • Identify the pneumatic brake components • Secure hydraulic attachments • Drain the air system • Service the air system components • Replace the worn-out parts • Adjust the brakes • Test the relief valves • Re-assemble the pneumatic brake components • Observe safety precautions • Clean tools, equipment, and workplace	Serviced pneumatic brakes conform to the manufacturer's specifications	**Knowledge evidence: Detailed knowledge of:** **Method used**: The student should explain the procedure of servicing pneumatic brakes. **Principles**: The student should explain the principles of servicing pneumatic brakes **Theories:** The student should describe: • Types of pneumatic brakes • Functions of pneumatic	The following tools, equipment and safety gears are to be available: • Service manual • Vehicle with pneumatic brakes • Tool kit • Bench vice • Wheel blocks • Air compressor • Brake shoe relining machine • Hammer • Grinding machine • Pressure gauge • Cleaning solvent • Jacks • Pry bar • Air leakage detector • Safety stands • Safety boots • Overall	26

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				• Store tools, equipment, and parts		brake components **Circumstantial knowledge:** **Detailed knowledge about:** • Observe safety precautions • Safe handling of work tools and equipment	• Mask • Gloves	
		(b) Servicing brake linings	**Brainstorming:** Guide the students to define brake linings and identify different types of brake linings **Practical work:** Lead the students on the various methods of servicing brake linings **Practical activity:** Organise the students in	**The student should be able to:** • Use the service manual • Select tools and equipment. • Identify the pneumatic brake components • Secure the hydraulic attachment • Drain the air system	Serviced pneumatic brakes conform to the manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used**: The student should explain the procedure for servicing brake linings **Principles**: The student	The following tools, equipment and safety gears are to be available: • Service manual • Vehicle with pneumatic brakes • Tool kit • Bench vice • Wheel blocks • Air compressor	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			manageable groups for servicing brake linings in the motor vehicle mechanic's workshop	• Service the air system components • Replace the worn-out parts • Adjust the brakes • Test the relief valves • Re-assemble the pneumatic brake components • Observe safety precautions • Clean tools, equipment, and workplace • Store tools, equipment, and parts		should explain the principles of servicing brake linings **Theories:** The student should describe the rules of servicing brake lining **Circumstantial knowledge:** **Detailed knowledge about:** • Observe safety precautions • Safe handling of work tools and equipment	• Brake shoe relining machine • Hammer • Grinding machine • Pressure gauge • Cleaning solvent • Jacks • Pry bar • Air leakage detector • Safety stands • Safety boots • Overall • Mask • Gloves	
	4.6 Servicing electronically controlled	(a) Diagnosing EBS	**Brainstorming:** Guide the students to explain the concept of diagnosing EBS and	**The student should be able to:** • Use the service manual	Serviced air braking systems and components function in	**Knowledge evidence:** **Detailed knowledge of:**	The following tools, equipment and safety gears are to be available:	25

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
	brake system (EBS)		identify methods of diagnosing EBS **Practical work:** Lead the students on the various methods of diagnosing EBS **Practical activity:** Organise the students in manageable groups for diagnosing EBS in the motor vehicle mechanic's workshop	• Select tools and equipment • Steam cleans the system components • Interpret the pneumatic circuit diagrams • Inspect the pneumatic brake components • Service the air braking system and its components • Test the brake system performance • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment	conformity to the manufacturer's specifications	**Method used:** The student should explain the procedure of diagnosing EBS **Principles:** The student should explain the principles of diagnosing EBS **Theories:** The student should explain the rules of diagnosing EBS **Circumstantial knowledge:** **Detailed knowledge about:** • Observe safety precautions • Safe handling of tools and equipment	• A truck with EBS brake systems • Tool kit • Air reservoir • Bench vice • Multimetre • Steam cleaner • Pressure gauge • Service manual • Coil spring tester • Heavy-duty hydraulic grills • Overall • Gloves • Safety boots	
		(b) Servicing electronic	**Brainstorming:** Guide the students to	**The student should be able to:**	Serviced electronic brake system (EBS)	**Knowledge evidence:**	The following tools, equipment and safety	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
		brake system (EBS)	explain the concept of servicing electronic brake system (EBS) and identify the methods of servicing electronic brake system (EBS) **Practical work:** Lead the students on the various methods of servicing electronic brake systems (EBS) **Practical activity:** Organise the students in manageable groups for servicing electronic brake systems (EBS) in the motor vehicle mechanic's workshop	• Use the service manual • Select tools and equipment • Steam cleans the system components • Interpret the pneumatic circuit diagrams • Inspect the pneumatic brake components • Service the air braking system and components • Test the brake system performance • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment	functions in conformity to manufacturer's specifications	**Detailed knowledge of:** **Method used:** The student should explain the procedure of servicing the electronic brake system (EBS) **Principles:** The student should explain the principles of servicing the electronic brake system (EBS) **Theories:** The student should explain the rules of servicing the electronic brake system (EBS) **Circumstantial knowledge:** **Detailed knowledge about:** • Observe safety	gears are to be available: • A truck with EBS brake systems • Tool kit • Air reservoir • Bench vice • Multimetre • Steam cleaner • Pressure gauge • Service manual • Coil spring tester • Heavy-duty hydraulic grills • Overall • Gloves • Safety boots	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						precautions • Safe handling of tools and equipment		
		(c) Adjusting electronic system	**Brainstorming:** Guide the students to explain the concept of adjusting the electronic system and identify the methods used in adjusting the electronic system **Practical work:** Lead the students on the various methods of adjusting the electronic system **Practical activity:** Organise the students in manageable groups to adjust electronic system in the motor vehicle mechanic's workshop	**The student should be able to:** • Use the service manual • Select tools and equipment • Steam cleans the system components • Interpret the electronic system • Inspect the electronic system • Adjust the electronic system • Test the brake system performance • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and	Adjusted electronic system function in conformity to manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure of adjusting the electronic system **Principles:** The student should explain the principles of adjusting the electronic system **Theories:** The student should explain the rules of adjusting the electronic system **Circumstantial knowledge:**	The following tools, equipment and safety gears are to be available: • A truck with EBS brake systems • Tool kit • Air reservoir • Bench vice • Multimetre • Steam cleaner • Pressure gauge • Service manual • Coil spring tester • Heavy duty hydraulic grills • Overall • Gloves • Safety boots	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				equipment		**Detailed knowledge about:** • Safety precautions while adjusting the electronic system • Safe handling of tools and equipment • Waste disposal		
		(d) Servicing S-Cams and wedge brakes	**Brainstorming:** Guide the students to define S-cams and wedge brakes and identify the types of S-cams and wedge brakes **Practical work:** Direct the students on the various methods of servicing S-cams and wedge brakes **Practical activity:** Organise the students in manageable groups for servicing S-Cams and wedge brakes in the	**The student should be able to:** • Use the service manual • Select tools and equipment • Inspect the S-Cams and wedge brakes • Adjust the S-Cams and wedge brakes system • Test the brake system performance • Observe safety precautions • Clean tools,	Serviced S-Cams and wedge brakes function in conformity to manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure of servicing S-Cams and wedge brakes **Principles:** The student should explain the principles of servicing S-cams and wedge brakes **Theories:** The	The following tools, equipment and safety gears are to be available: • A truck with EBS brake systems • Tool kit • Air reservoir • Bench vice • Multimetre • Steam cleaner • Pressure gauge • Service manual • Coil spring tester • Heavy duty	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			motor vehicle mechanic's workshop	equipment, and workplace • Store tools and equipment		student should explain the rules of servicing S-cams and wedge brakes **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while adjusting electronic system • Safe handling of tools and equipment • Waste disposal	hydraulic grills • Overall • Gloves • Safety boots	
		(e) Servicing brake boosters	**Brainstorming:** Guide the students to explain the concept of servicing brake boosters and identify the methods used in for servicing brake boosters **Practical work:** Direct the students on the	**The student should be able to:** • Use the service manual • Select tools and equipment • Inspect the brake boosters • Service the brake boosters	Serviced brake boosters' function in conformity to the manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure of servicing brake boosters	The following tools, equipment and safety gears are to be available: • A truck with EBS brake systems • Tool kit • Air reservoir • Bench vice	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			various methods of servicing brake boosters **Practical activity:** Organise the students in manageable groups for servicing brake boosters in the motor vehicle mechanic's workshop	• Test the brake booster performance • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment		**Principles:** The student should explain the principles of servicing brake boosters **Theories:** The student should explain the rules of servicing brake boosters **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while adjusting the electronic system • Safe handling of tools and equipment • Waste disposal	• Multimetre • Steam cleaner • Pressure gauge • Service manual • Coil spring tester • Heavy duty hydraulic grills • Overall • Gloves • Safety boots	
5.0 Maintaining steering	5.1 Performing wheel	(a) Replacing steering	**Brainstorming:**	**The student should be**	Replaced steering	**Knowledge**	The following tools,	103

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
system	alignment	joints and linkages	Guide the students to define steering joints and linkages and identify types of steering joints and linkages **Practical work:** Direct the students on the various methods of replacing steering joints and linkages **Practical activity:** Organise the students in manageable groups to replace steering joints and linkages in the motor vehicle mechanic's workshop	**able to:** • Use the service manual • Select tools and equipment • Replace the damaged tyres • Rectify the steering system and its components • Rectify the suspension system and components • Fill the fuel tank • Fill coolant into the radiator • Adjust the camber angle • Adjust the kingpin inclination • Adjust the toe in/toe out • Align the steering wheel • Organise the road test • Observe safety	joints and linkages performed as per manufacturer's specifications	**evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure of replacing the steering joints and linkage angle **Principles:** The student should explain the principles of Replacing the steering joints and linkages **Theories:** The student should explain the rules of replacing steering joints and linkages **Circumstantial knowledge:** **Detailed knowledge about:** • Safety	equipment and safety gear are to be available: • Service manual • Complete vehicle with driver • Tool kit • Optical wheel alignment gauges/equipment • Computerised wheel alignment gauge • Air compressor • Pipe wrench • Camber/castor gauge • Kingpin gauge • Turn table. • Tyre pressure gauge • Side slip tester • Vernier height gauge • Puller	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				precautions • Clean tools, equipment, and work place • Store tools, equipment, and parts		precautions while performing wheel alignment • Safe handling of work tools, equipment, and parts • Waste disposal	• Hammer • Gloves • Overall • Safety boots	
		(b) Performing wheel alignment	**Brainstorming:** Guide the students to define wheel alignment and identify the methods of performing wheel alignment **Practical work:** Direct the students on the various techniques of performing wheel alignment **Practical activity:** Organise the students in manageable groups to perform wheel alignment	**The student should be able to:** • Use the service manual • Select tools and equipment • Replace the damaged tyres • Rectify the steering system and its components • Rectify the suspension system and its components • Fill the fuel tank	Performed wheel alignment performed as per manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure of performing wheel alignment **Principles:** The student should explain the principles of performing wheel	The following tools, equipment and safety gears are to be available: • Service manual • Complete vehicle with driver • Tool kit • Optical wheel alignment gauges/equipment • Computerised wheel alignment	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			in the motor vehicle mechanic's workshop	• Adjust the camber angle • Adjust the kingpin inclination • Adjust the toe in/toe out • Align the steering wheel • Organise the road test • Observe safety precautions • Clean tools, equipment, and workplace • Store tools, equipment, and parts		alignment **Theories:** The student should explain the rules for performing wheel alignment **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while performing wheel alignment • Safe handling of work tools, equipment, and parts • Waste disposal	gauge • Air compressor • Pipe wrench • Camber/castor gauge • Kingpin gauge • Turn table • Tyre pressure gauge • Side slip tester • Vernier height gauge • Puller • Hammer • Gloves • Overall • Safety boots	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
	5.2 Servicing steering boxes	(a) Overhauling a steering box	**Brainstorming:** Guide the students to explain the concept of overhauling a steering box and identify the methods used in rebuilding a steering box **Practical work:** Direct the students on the various methods of overhauling a steering box **Practical activity:** Organise the students in manageable groups for overhauling a steering box in the motor vehicle mechanic's workshop	**The student should be able to:** • Use the service manuals • Select tools and equipment • Dismantle the steering box • Clean parts • Inspect the parts • Replace the worn-out parts • Reassemble the steering box • Install the steering box • Adjust the steering box free play • Align the wheels • Test the steering box • Observe safety precautions • Clean tools, equipment, and work place • Store tools, equipment, and parts	Serviced steering box conforms to manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure of overhauling a steering box **Principles:** The student should explain the principles of overhauling a steering box **Theories:** The student should explain: • The functions of a steering box • Types of steering boxes • Required service on steering boxes	The following tools, equipment and safety gears are to be available: • Steering box assembly • Service manual • Tool box • Work bench • Bench vice • Oil container • Set of screw driver • Ball peen hammer • Plastic hammer • Spring balance • Puller • Overall • Safety boots • Gloves	38

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						• Steering ratio • Steering columns **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions when performing the task • Safe handling of work tools • Waste disposal		
		(b) Adjusting steering box back-lash	**Group discussion:** Organise students in small groups and guide them to apply automotive knowledge to describe a	**The student should be able to:** • Use the service manuals • Select tools and	Serviced steering box conforms to manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The	The following tools, equipment and safety gears are to be available: • Steering box	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			steering box back-lash **Hands-on activities:** Guide students in small groups through hands-on activities to adjust steering box back-lash in motor vehicle mechanics. **Practical activity:** Organise the students in manageable groups to adjust a steering box back-lash in the motor vehicle mechanic's workshop	equipment • Dismantle the steering box • Clean the parts • Inspect the parts • Replace the worn-out parts • Reassemble the steering box • Install the steering box • Adjust the steering box free play • Align the wheels • Test the steering box • Observe safety precautions • Clean tools, equipment, and place workplace • Store tools, equipment, and parts		student should explain the procedure of adjusting the steering box back-lash **Principles:** The student should explain the principles of Adjusting a steering box back-lash **Theories:** The student should explain the rules for adjusting a steering box back-lash **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while performing wheel	assembly • Service manual • Tool box • Work bench • Bench vice • Oil container • Set of screw driver • Ball peen hammer • Plastic hammer • Spring balance • Puller • Overall • Safety boots • Gloves	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						alignment • Safe handling of work tools, equipment, and parts • Waste disposal		
	5.3 Servicing power steering systems	(a) Overhauling power steering pump	**Brainstorming:** Guide the students to define a power steering pump and identify different types of power steering pumps **Practical work:** Direct the students on the various methods of overhauling a power steering pump **Practical activity:** Organise the students in manageable groups to overhaul the power steering pump in the motor vehicle	**The student should be able to:** • Use the service manual • Select tools and equipment • Check the steering system fluid level and condition • Dismantle the power steering pump • Service the power steering pump • Refit the power steering • Perform the bleeding of steering system • Test the steering system	Power steering system serviced as per manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the procedure of overhauling a power steering pump **Principles:** The student should explain the principles of Overhauling a power steering pump **Theories:** The	The following tools, equipment and safety gears are to be available: • Vehicle with power steering system • Service manual • Tool kit • Work bench • Service pit/hoist • Oil container • Flow meter • Plastic hammer • Ball peen Hammer • Spring balance • Puller • Gloves	125

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			mechanic's workshop	• Observe safety precautions • Clean tools, equipment, and work place • Store tools, equipment, and parts		student should explain the rules of Overhauling a power steering pump **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while servicing power steering system • Safe handling of work tools and equipment • Waste disposal	• Overall • Safety boots • Safety clear glasses	
		(b) Servicing power steering components	**Brainstorming:** Guide the students to explain the concept of power steering components and identify different components of	**The student should be able to:** •Use the service manual •Select tools and equipment	Power steering components serviced as per manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used**: The student should	The following tools, equipment and safety gears are to be available: • Vehicle with power steering	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			a power steering wheel **Practical work:** Guide the students on the various methods of overhauling the power steering components **Practical activity:** Organise the students in manageable groups for overhauling the power steering components in the motor vehicle mechanic's workshop	•Check the steering system fluid level and condition •Dismantle the power steering pump •Service the power steering pump •Refit the power steering •Perform bleeding of the steering system •Test the steering system •Observe safety precautions •Clean tools, equipment, and work place •Store tools, equipment, and parts		explain the procedure of servicing power steering components **Principles:** The student should explain the principles of servicing the power steering components **Theories:** The student should explain the rules of overhauling the power steering components **Circumstantial knowledge:** **Detailed knowledge about:** •Safety precautions while servicing the power steering system •Safe handling of	system • Service manual • Tool kit • Work bench • Service pit/hoist • Oil container • Flow meter • Plastic hammer • Ball peen Hammer • Spring balance • Puller • Gloves • Overall • Safety boots • Safety clear glasses	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						work tools and equipment •Waste disposal		

Form Three

Table 5: *Detailed Contents for Form Three*

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
1.0 Carrying out engine maintenance	1.1 Diagnosing engine performance	(a) Performing engine compression test	**Brainstorming** Guide students through ICT learning approach to describe engine compression test **Practical work:** Guide the students on how to perform engine compression test **Practical activity:** Organise the students in manageable groups to perform engine compression test	**The student should be able to:** • Use the service manual • Select tools and equipment • Perform engine compressions test • Observe safety precautions • Clean tools, equipment, and work place • Store tools and equipment	Performed engine compression test conforms to manufacturer's specifications	**Knowledge evidence: Detailed knowledge of:** **Method used:** The student should explain how to: • Perform engine compression test **Principles:** The student should explain the principles for: • Performing engine compression test • **Theories:** The student should explain: The process for performing engine compression test • **Circumstantial knowledge: Detailed knowledge about** • Safety precautions	The following tools, equipment and safety gears are to be available: • Petrol engine and diesel engine (in running condition) • Engine compression tester • Spark plug spanner • Engine analyzer • Tool kit • Data book/service manual	28

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						while performing engine compression test • Workshop rules and regulations • Manufacturers service manual		
		(b) Performing cylinder leakage test	**Brainstorming:** Guide students to brainstorm on different methods of performing cylinder leakage test **Practical work:** Guide students through manageable groups to discuss the principles of performing cylinder leakage test **Practical activity:** Organise the students in manageable groups to perform the cylinder leakage test	**The student should be able to:** • Use the service manual • Select tools and equipment • Perform cylinder leakage test • Observe safety precautions • Clean tools, equipment, and workplace	Performed cylinder leakage test conforms to/ in accordance to the manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Perform cylinder leakage test **Principles:** The student should explain the principles involved in performing an engine leakage test **Theories:** The student should explain: • The standard methods for performing	The following tools, equipment and safety gears are to be available: • Petrol engine and diesel engine (in running condition) • Cylinder leakage tester • Spark plug spanner • Engine analyzer • Tool kit. • Data book/service manual • Gloves • Safety gear	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						cylinder leakage test **Circumstantial knowledge:** **Detailed knowledge about** • Safety precautions while performing engine non-destructive tests • Workshop rules and regulations • Manufacturers service manual • Waste disposal		
	1.2 Dismantling engines	(a) Dismantling cylinder head	**Brainstorming** Guide students through the ICT learning approach to describe cylinder head dismantling **Practical work:** Guide the students on how to dismantle the cylinder head correctly	**The student should be able to:** • Use the service manual • Select tools and equipment • Detach the cylinder head • Clean the parts • Observe safety precaution • Clean tools and workplace • Store tools and parts	The engine dismantled according to the manufacturer's service manual	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Dismantle the cylinder head **Principles:** The student should explain the	• The following tools, equipment and safety gear are to be available: • Petrol engine and diesel engine (in running condition) • Engine crane	37

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			Practical activity: Organise the students in manageable groups to identify the causes of cylinder head dismantling			principals involved in dismantling the cylinder head **Theories:** The student should explain: • The standard way for dismantling the cylinder head **Circumstantial knowledge:** **Detailed knowledge about** Safety precautions while performing engine non-destructive tests • Safety precautions • First aid • Workshop rules and regulations • Manufacturers service manual • Waste disposal	• Piston ring squeezer • Valve spring compressor • Cam lobe lifter • Wire rope • Spark plug spanner • Engine analyser • Tool kit	
		(b) Dismantling oil sump	**Brainstorming** Guide students to brainstorm on the concepts and principles of oil sump dismantling	**The student should be able to:** • Use the service manual • Select tools and equipment	Oil sump dismantled according to the manufacturer's service manual	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The	The following tools, equipment and safety gears are to be available: • Petrol engine	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			Practical work: Guide the students on how to detach the oil sump correctly **Practical activity:** Organise the students in manageable groups to identify different construction of oil sump	• Detach the crankcase and oil sump • Clean the parts • Observe safety precautions • Clean tools and equipment • Store tools, parts, and equipment		student should explain how to: • Dismantle the oil sump • Clean the sump **Principles:** The student should explain the principles of dismantling the oil sump **Theories:** The student should explain: • The process of oil sump removal **Circumstantial knowledge:** **Detailed knowledge about** • Safety precautions • First aid • Workshop rules and regulations • Manufacturers service manual • Waste disposal	and diesel engine (in running condition) • Engine crane • Tool kit	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
		(c) Dismantling cylinder block	**Brainstorming:** Guide students to brainstorm on the concepts and principles of dismantling cylinder block **Practical work:** Guide the students on how to dismantle cylinder blocks correctly **Practical activity:** Organise the students in manageable groups to identify different types of cylinder blocks	**The student should be able to**: • Use the service manual • Select tools and equipment •Dismantle the cylinder block • Clean the parts • Observe safety precautions • Clean tools, equipment, and workplace • Store tools, parts, and equipment	The cylinder block was dismantled according to the manufacturer's service manual	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Dismantle the engine cylinder block **Principles:** The student should explain the principles of dismantling the cylinder block **Theories:** The student should explain: The standard procedure for dismantling the cylinder block **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions • First aid • Workshop rules and	The following tools, equipment and safety gears are to be available: • Petrol engine and diesel engine (in running condition) • Engine crane • Piston ring squeezer • Wire rope • Tool kit	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						regulations • Manufacturers service manual • Waste disposal		
	1.3 Servicing Cylinder head	(a) Refacing cylinder head	**Brainstorming:** Guide students through hands-on activities to demonstrate cylinder head refacing **Practical work:** Guide the students to reface the cylinder head correctly **Practical activity:** Organise the students in manageable groups to identify methods of refacing the cylinder head	**The student should be able to:** • Use the service manual • Select tools and equipment • Inspect the cylinder head for warpage • Reface the cylinder head • Clean the cylinder head • Test for valve leakage • Observe safety precautions	The refaced cylinder head conforms to the manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Reface cylinder head **Principles:** The student should explain the principles of: Refacing the cylinder heads **Theories:** The student should explain: • The procedure for refacing the cylinder head **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions • First aid	The following tools, equipment and safety gears are to be available: • Straight edge bar • Feeler gauge • Valve seat cutting machine • Wire brush • Valve • Tri-square • Bevel protractor • Valve spring lifter • Tool kit • Valve refacing machine • Spark plug spanner • Hand drill machine • Dial gauge	35

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						• Workshop rules and regulations • Manufacturers service manual • Waste disposal	• Surface plate/ gauge • Vernier calliper • Grinding paste • Lapping stick • Service manual • Air compressor • Safety gears	
		(b) Performing valve lapping	**Brainstorming:** Guide students to brainstorm on the concepts valve lapping **Practical work:** Provide students with hands-on activities to explore the concepts of valve lapping **Practical activity:** Organise the students in manageable groups to perform valve lapping	**The student should be able to:** • Use the service manual • Select tools and equipment • Inspect valves for wear and bend • Grind valves and valve seats • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment	Performed valve lapping conforms to manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to perform valve lapping **Principles:** The student should explain the principles of performing valve lapping **Theories:** The student should explain: • The procedure for performing valve lapping	The following tools, equipment, and safety gears should • Valve seat cutting machine • Tool kit • Valve refacing machine • Hand drill machine • Dial gauge • Surface plate/ gauge • Vernier calliper • Grinding paste	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						Circumstantial knowledge: **Detailed knowledge about:** • Safety precautions • First aid • Workshop rules and regulations • Manufacturers service manual • Waste disposal	• Lapping stick • Service manual • Air compressor • Gloves • Safety gears • Oil can	
		(c) Assembling cylinder head	**Brainstorming:** Guide students through hands-on activities to demonstrate cylinder head assembling **Practical work:** Guide the students to assemble the cylinder head correctly **Practical activity:** Organise the students in manageable groups to perform cylinder head assembling	**The student should be able to:** • Use the service manual • Select tools and equipment • Assemble cylinder head • Test valves for leakage • Observe safety precautions • Clean tools, equipment and workplace • Store tools and equipment	Assembled cylinder head conforms to manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Assemble cylinder head • Test for cylinder head valve leakage **Principles:** The student should explain the principles involved in cylinder head assembling **Theories:** The	The following tools, equipment and safety gears are to be available: • Torque wrench • Cylinder head assembly • Valve • Valve spring lifter • Tool kit • Spark plug spanner • Service manual • Air compressor • Safety gears	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						student should explain: • The sequence of assembling cylinder head **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions • First aid • Workshop rules and regulations • Manufacturers service manual • Waste disposal	• Oil can	
	1.4. Performing cylinder block measurements	(a) Checking cylinder block warpage	**Brainstorming:** Guide the students to define cylinder block warpage **Practical work:** Guide the students on how to measure cylinder block warpage correctly **Practical activity:** Organise the students in manageable groups to perform cylinder block	**The students should be able to:** • Use the service manual • Select tools and equipment • Clean the cylinder block • Identify a warped point on the cylinder block surface • Perform surface grinding	Cylinder block warpage performed according to the manufacturer's manual	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Check cylinder block warpage **Principles:** The student should explain the principles of: Checking cylinder	This element can be achieved at a school workshop. The following tools, equipment and safety gear are to be available: • Workbench • Engine block • Straight edge • Feeler gauge • Air blow • Service	37

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			warpage and interpret the measurement	• Interpret measurement		block warpage **Theories:** The student should explain: • The procedure for checking cylinder block warpage **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions • First aid • Workshop rules and regulations • Manufacturers service manual • Waste disposal	manual • Safety gears	
		(b) Performing cylinder bore measurement	**Brainstorming:** Guide students through interactive simulation and animation to visualise the concepts and principles for performing cylinder bore measurements **Practical work:**	**The students should be able to:** • Use the service manual • Select tools and equipment • Check the cylinder bore wear • Check camshaft	Cylinder block measurements and reboring were performed according to the manufacturer's manual and recommendation	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Perform cylinder bore measurements	The following tools, equipment and safety gear are to be available: • Workbench • Engine block • Internal micrometer	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			Guide students through interactive simulation and animation to visualise the concepts and principles of bore measuring **Practical activity:** Organise the students in manageable groups to perform cylinder bore measurements	bore (For engine with camshaft located in the cylinder block) • Calculate the maximum taper and ovality • Interpret measurements • Perform reboring /sleeves • Observe safety precautions • Clean tools, equipment and workplace • Store tools, equipment, and parts		**Principles:** The student should explain the principles of: • Measuring cylinder bore **Theories:** The student should explain: • The procedure for measuring cylinder bore **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions • First aid • Workshop rules and regulations • Manufacturers service manual • Waste disposal	• Cylinder bore gauge and attachments • Line boring machine • Service Manual • Safety gears	
		(c) Check camshaft journal bores	**Brainstorming:** Provide students with experiments to explore the concepts and principles for checking	**The students should be able to:** • Use the service manual Select tools and equipment • Clean the cylinder	Checked camshaft journal bores conform to manufacturer's manual	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The	The following tools, equipment and safety gears are to be available:	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			camshaft journal bore **Practical work:** Guide the students to check the camshaft journal bore **Practical activity:** Organise the students in manageable groups to identify and check the camshaft journal bore	block • Check the crankshaft •		student should explain how to: • Check camshaft journal bore **Principles:** The student should explain the principles of: • Checking camshaft journal bore **Theories:** The student should explain: • The procedure for checking the camshaft journal bore **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions • First aid • Workshop rules and regulations • Manufacturers service manual • Waste disposal	• Work bench • Engine block • Internal micrometer • Telescopic gauge • Vernier calliper • Safety gears	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
	1.4 Performing crankshaft measurements	(d) Checking bearing oil clearance	**Brainstorming:** Guide students in manageable groups through hands-on activities to demonstrate the concepts of checking bearing oil clearance **Practical work:** Guide the students to measure oil clearance correctly **Practical activity: Activities** Guide students in manageable groups through hands-on activities to demonstrate the concepts of checking bearing oil clearance	**The student should be able to:** • Use the service manual • Select tools and equipment • Clean the crankshaft • Tighten the main bearing caps • Check the oil clearance • Observe safety precautions • Clean tools, equipment, parts, and workplace • Store tools and equipment	• Checked camshaft journal bores conform to manufacturer's manual • Crankshaft measurements were done as per the manufacturer's specifications and recommendations • Crankshaft measurements were done as per the manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Check bearing oil clearance. **Principles:** The student should explain the principles of: • Taking bearing oil clearance measurements. **Theories:** The student should explain: • The process of measuring bearing oil clearance **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions • First aid • Workshop rules and	The following tools, equipment and safety gears are to be available: • Tool kit • Torque wrench • Feeler gauge • Plast gage • Cylinder block • Crankshaft • Connecting rod • Vee-blocks • Service manual • Cranks shaft grinding machine • Gloves • Safety glass • Overall safety gears	35

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						regulations • Manufacturers service manual • Waste disposal		
		(e) Checking crankshaft straightness	**Brainstorming:** Guide students to use different simulation software to visualise the methods of checking camshaft **Practical work:** Guide the students to measure crankshaft straightness **Practical activity:** Organise the students in manageable groups to identify different methods of measuring camshaft straightness	**The student should be able to:** • Use the service manual • Select tools and equipment • Clean the crankshaft • Check the crankshaft weights (webs) • Check the crankshaft run out • Check the end float • Measure the crankshaft journals • Observe safety precautions • Clean tools, equipment, parts, and workplace • Store tools and equipment	Crankshaft straightness checked as per manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Inspect crankshaft straightness **Principles:** The student should explain the principles of: • Checking crankshaft straightness **Theories:** The student should explain the process of checking crankshaft straightness • **Circumstantial knowledge: Detailed knowledge about:**	This element can be achieved at a school training workshop. The following tools, equipment and safety gear are to be available: • Tool kit • Large screen TV/Computer • Micrometer • Torque wrench • Dial gauge • Cylinder block • Crankshaft • Connecting rod • Service Manual • Safety gears	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						• Safety precautions • First aid • Workshop rules and regulations • Manufacturers service manual • Waste disposal		
		(f) Checking crankshaft journals	**Brainstorming:** Guide students through think-ink-pair-share to describe various methods of checking crankshaft journal **Practical work:** Guide students in small groups to conduct experiments of checking the crankshaft journal **Practical activity:** Guide students in small groups through hands-on activities to familiarise themselves with various methods of checking crankshaft journal	**The student should be able to:** • Use the service manual • Select tools and equipment • Clean the crankshaft journals • Measure the crankshaft journals • Check the end float • Observe safety precautions • Clean tools, equipment, parts, and workplace • Store tools and equipment	Crankshaft journal measurements were done as per manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Inspect • crankshaft journal and end **Principles:** The student should explain the principals involved in checking the crankshaft journal **Theories:** The student should explain the methods of checking the crankshaft journal **Circumstantial knowledge:**	The following tools, equipment and safety gear are to be available: • Tool kit • Micrometer • Torque wrench • Dial gauge • Cylinder block • Crankshaft • Connecting rod • Service Manual • Safety gears	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						Detailed knowledge about: • Safety precautions • First aid • Workshop rules and regulations • Manufacturers service manual • Waste disposal		
	1.5 Performing camshaft measurements	(a) Checking camshaft for wear	**Brainstorming:** Guide students through interactive simulation to visualise checking of camshaft wear **Practical work:** Guide students through experiments using measuring instruments to check camshaft wear and record **Practical activity:** Organise the students in manageable groups to perform camshaft wear checks	**The student should be able to:** • Use the service manual • Select tools and equipment • Dismantle the camshaft • Clean the parts • Measure for wear • Observe safety precautions • Clean tools, equipment, and work place • Store tools and equipment	Measured camshaft conforms to manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Remove camshaft from the engine • Measure for wear • Refit camshaft **Principles:** The student should explain the principles of: • Checking camshaft wear, taking camshaft	The following tools, equipment and safety gears are to be available: • Diesel or petrol engine camshaft • Large screen TV/ Computer • Service manual • Valve lifter • Dial gauge • V-Blocks • Work bench • Micrometer • Tool kit • Overall • Safety boo • Gloves	22

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						measurements **Theories:** The student should explain: • The camshaft wear and their causes **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions • First aid • Workshop rules and regulations • Manufacturers service manual • Waste disposal		
		(b) Checking camshaft straightness	**Brainstorming:** Guide students through a problem-based approach to check camshaft wear **Practical work:** Guide students through experiments using measuring instruments to check camshaft straightness	**The student should be able to:** • Use the service manual • Select tools and equipment • Dismantle the camshaft • Clean the parts • Measure for straightness	Checked camshaft conforms to manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Check camshaft straightness **Principles:** The student should	The following tools, equipment and safety gear are to be available: • Questions • Diesel or petrol engine camshaft • Service Manual • Dial gauge	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			Practical activity: Organise the students in manageable groups to demonstrate checking of camshaft straightness	• Observe safety precautions • Problem-based approach • Clean tools, equipment, and workplace • Store tools and equipment		explain the principles of: • Checking camshaft straightness **Theories:** The student should explain: • Purpose of checking camshaft straightness **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions • First aid • Workshop rules and regulations • Manufacturers service manual • Waste disposal	• V-Blocks • Workbench • Micrometer • Tool kit • Overall Safety gears	
	1.6 Checking connecting rods	(a) Checking the condition of connecting rod	**Brainstorming:** Guide students to demonstrate the use of specific measuring tools to check the condition of the connecting rod	**The student should be able to:** • Use the service manual • Select tools and equipment • Detach the connecting	Checked connecting rod conforms to manufacturer's standards	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to:	The following tools, equipment and safety gears are to be available: • Connecting rod jig • Surface plate	22

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			Practical work: Guide students through a problem-based approach to apply measurements of respective physical quantities to check the condition of the connecting rod **Practical activity:** Guide students through experiments using measuring instruments to check the condition of the connecting rod	rod • Clean the connecting rod • Check the connecting rod for overheating, damage, or wear • Check the connecting rod for deformation • Check oil holes		• Check the connecting rod for bend and twist • Check positions for measuring big and small end bearings **Principles:** The student should explain the principals involved in checking the connecting rod **Theories:** The student should explain: • Purpose for checking connecting **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions • First aid • Workshop rules and regulations • Manufacturers service manual • Waste disposal	• Work bench • Dial gauges • Telescopic gauge • Inside and outside micro meter • Venier calliper • Thin wire • Hammer • Service manual • Drift • Hydraulic press • Reamer	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
		(b) Checking connecting rod straightness	**Brainstorming:** Guide students to demonstrate the use of specific measuring tools for checking the straightness of connecting rod **Practical work:** Guide students through a problem-based approach to apply measurements of respective physical quantities to check connecting rod straightness **Practical activity:** Organise the students in manageable groups and guide them through experiments using measuring instruments to check the straightness of connecting rod	**The student should be able to:** • Use the service manual • Select tools and equipment • Detach the connecting rod • Clean the connecting rod • Check the connecting rod for deformation • Match the connecting rod with its cap • Align the connecting rod • Recondition the connecting rod bore • Observe safety precautions • Clean tools, equipment, and workplace • Store tools, equipment and parts	Checked connecting rod straightness conforms to manufacturer's standards	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Check the connecting rod for bend and twist • Check positions for measuring big and small end bearings • Perform connecting rod straightening **Principles:** The student should explain the principals involved in checking the connecting rod straightness **Theories:** The student should explain: • The purpose of checking the connecting rod	The following tools, equipment and safety gears are to be available: • Connecting rod jig • Surface plate • Work bench • Dial gauges • Telescopic gauge • Inside and outside micro meter • Thin wire • Hammer • Service manual • Drift • Hydraulic press • Reamer • Safety gears	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						straightness **Circumstantial knowledge:** **Detailed knowledge about:** • First aid • Workshop rules and regulations • Manufacturers service manual • Waste disposal		
	1.7 Checking piston wear	(a) Checking piston ring groove	**Brainstorming:** In small groups, guide students through interactive simulation to visualise and explain different types of piston ring grove **Practical work:** Guide students in small groups through hands-on activities using a feeler gauge to check the piston ring groove **Practical activity:** Organise the students in manageable groups to check piston grooves	• The student should be able to: • Use the service manual • Select tools and equipment • Dismantle the piston • Clean the piston • Check signs of wear or scuffing • Inspect piston crowns, ring lands and grooves • Identify the causes of damages • Observe safety precautions • Clean tools, equipment, and work place • Store tools, equipment, and parts	Piston grooves are checked according to the manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Dismantle the piston • Clean the piston parts • Take the piston measurements • Assemble the piston **Principles:** The student should explain the principles involved in checking the	This element can be achieved at a workplace or training institution. The following tools, equipment and safety gear are to be available: • Manual book • Piston assembly • External micrometer • Feeler gauge • Piston ring groove cleaner • Vernier calliper	22

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						piston groove **Theories:** The student should explain: • The importance of checking piston grooves and piston measurements **Circumstantial knowledge:** **Detailed knowledge about:** • First aid • Workshop rules and regulations • Manufacturers service manual • Waste disposal	• Piston ring expander • Scraper • Work bench • Hammer or mallet • Oil can • Hand driven cutter and pilot assembly (special tool) • Internal micrometer • Safety gears	
		(b) Performing piston measurements	**Interactive Simulation:** Guide students to use interactive simulation to measure piston artefacts **Practical work:** Guide students in small groups to use knowledge and skills of motor vehicle mechanics through hands-on activities to take piston	**The student should be able to:** • Use the service manual • Select tools and equipment • Dismantle the piston • Clean the piston • Identify the piston-measuring positions • Measure the piston • Observe safety precautions	Performing piston measurements conforms to the manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Take the piston measurements **Principles:** The student should explain the principles of	The following tools, equipment and safety gear are to be available: • Manual book • Video, Multimedia • Piston assembly • External micrometer • Feeler gauge	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			measurement **Practical activity:** Organise the students in manageable groups to take piston measurement	• Clean tools, equipment, and work place • Store tools, equipment, and parts		measuring the piston **Theories:** The student should explain: • The importance of taking various piston measurements **Circumstantial knowledge:** **Detailed knowledge about:** • First aid • Workshop rules and regulations • Manufacturers service manual • Waste disposal	• Piston ring groove cleaner • Vernier calliper • Piston ring expander • Scraper • Work bench • Hammer or mallet • Oil can • Hand driven cutter and pilot assembly (special tool) • Internal micrometer • Safety gears	
	1.8 Assembling engine	(a) Assembling engine components	**Group discussion:** Organise students in small groups to describe the principles for assembling engine components . **Hands-on activities:** Guide students in small groups through hands-on	**The student should be able to:** Use the service manual • Select tools and equipment • Identify the major components of the engine • Lubricate the engine parts • Perform the crankshaft	Engine assembled as per manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Assemble the engine components **Principles:** The	The following tools, equipment and safety gears are to be available: • Vehicle/ petrol/engine • Torque wrench • Timing torch for petrol/engines	35

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			activities to familiarize themselves with various principles of assembling engine components. **Problem-based approach**: Guide students through a problem-based approach to apply measurement and fastener to assemble engine components	assembly • Install the piston and connecting rod assembly • Install the oil pump and oil sump • Install the cylinder head • Install the timing mechanism and cover • Install the flywheel and clutch assembly • Test the engine • Perform the engine tune-up • Observe safety precautions • Clean tools, equipment, and workplace. • Store tools and equipment		student should explain the principles of: • Assembling the engines **Theories:** The student should explain: • Different types of engines and • Reassembling the engines **Circumstantial knowledge:** **Detailed knowledge about:** • First aid • Workshop rules and regulations • Manufacturers service manual • Waste disposal	• Tool kit • Service Manual • Container – (small) with a flexible pipe • Service lamp • Wheel stoppers/wedges • Safety gears	
	1.10 Carrying out ignition system	(a) Performing spark ignition timing	**Problem-based approach**: Guide students through a problem-based approach to perform spark ignition timing **Practical work:**	**The student should be able to:** • Use the service manual • Select tools and equipment • Identify the timing marks	Adjusted ignition timing conforms to the manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Perform petrol	The following tools, equipment and safety gears are to be available: • Vehicle/ petrol • Timing torch for petrol/engines • Tool kit	48

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			Guide the students to perform spark ignition timing **Practical activity:** Organise the students in manageable groups to perform spark ignition timing	• Perform the ignition timing • Test the engine function ability • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment		engine ignition timing • Perform engine injection timing • Principles: The student should explain the principles of: • Operating the spark ignition engine • Combusting the compression of the ignition engine • Setting spark ignition timing • Setting compression ignition timing. **Theories:** The student should explain: • Diesel compression ignition system • Petrol spark ignition system • Effects of wrong timing	• Service manual • Container – (small) with a flexible pipe • Service lamp • Wheel stoppers/wedges • Safety gears	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						• Ignition timing process **Circumstantial knowledge:** **Detailed knowledge about:** • First aid • Workshop rules and regulations • Manufacturers service manual • Waste disposal		
		(b) Performing compression ignition timing	**Problem-based approach**: Guide students through a problem-based approach to perform compression ignition timing **Practical work:** Guide the students to perform compression ignition timing **Practical activity:** Organise the students in manageable groups to perform compression ignition timing	**The student should be able to:** • Use the service manual • Select tools and equipment • Identify the timing marks • Perform fuel injection pump timing • Test the engine function ability • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and	Adjusted ignition timing conforms to the manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Perform fuel injection timing **Principles:** The student should explain the principles of: • Compressing the ignition engine **Theories:** The student should explain: • Fuel injection		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
				equipment		timing for compression ignition engine **Circumstantial knowledge:** **Detailed knowledge about:** • First aid • Workshop rules and regulations • Manufacturers service manual • Waste disposal		
	1.11 Adjust valve clearance	(a) Performing valve overlap adjustments method	**Experimentation:** Guide students in small groups through experiments to perform valve, overlap adjustments **Practical work:** Guide the students to perform valve overlap **Practical activity:** Organise the students in manageable groups to perform valve overlap adjustment	**The student should be able to:** • Use of the service manual • Select tools and equipment • Perform valve overlap adjustments • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment	Adjusted valve clearance conforms to the manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to perform the following: • Valve adjustment • Valves overlap adjustment method • one-to-one valve adjustment method **Principles:** The student should explain the	This element can be achieved at a school training workshop. The following tools, equipment and safety gear are to be available: • Vehicle/stationery engine • Service Manual • Tool kit • Filler gauges • Cam lifter • Safety gears	28

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						principles of valve overlap adjustment **Theories:** The student should explain: • Effects of incorrect valve adjustment **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while adjusting valve clearance • Safe handling of work tools and equipment • Waste disposal		
		(b) Performing one-to-one valve adjustments method	**Interactive Simulation:** Guide students to use interactive simulation to perform one to one valve adjustment **Practical work:** Guide the students to perform one-to-one valve adjustment **Practical activity:**	**The student should be able to:** • Use of the service manual • Select tools and equipment • Perform one-to-one valve adjustments • Observe safety precautions • Clean tools, equipment, and workplace	Adjusted valve clearance conforms to the manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to perform one-to-one valve adjustment **Principles:** The student should explain the	This element can be achieved at a school training workshop. The following tools, equipment and safety gear are to be available: • Vehicle/stationery engine • Service Manual • Tool kit	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			Organise the students in manageable groups to perform one-to-one valve adjustment	• Store tools and equipment		principles of one-to-one valve adjustment **Theories:** The student should explain: • The procedure for performing one-to-one valve adjustment **Circumstantial knowledge:** **Detailed knowledge about:** • First aid • Workshop rules and regulations • Manufacturers service manual • Waste disposal	• Filler gauges • Micrometer • Cam lifter • Safety gears	
2.0 Maintain fuel system	2.1 Servicing petrol fuel system	(a) Servicing carburation fuel system	**Jigsaw:** Guide students in manageable groups using the jigsaw method to explore the concepts and principles of carburation **Practical work:** Guide the students to maintain carburettor	**The student should be able to:** • Use the service manual • Select tools and equipment • Service the carburettor fuel system • Test the fuel system • Observe safety	The serviced carburation fuel system conforms to the manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Diagnose components of the carburettor fuel system	The following tools, equipment and safety gears are to be available: • Vehicle with petrol engine (carburetion system or fuel injection) • Vehicle with electronically	56

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			Hands-on activities: Engage students in hands-on experiments to illustrate the servicing of a carburettor fuel system	precautions • Clean tools, equipment, and workplace • Store tools, equipment, and parts		**Principles:** The student should explain the principles of: • Servicing carburettor's fuel systems • **Theories:** The student should explain: The components and types of carburettors **Circumstantial knowledge:** **Detailed knowledge about:** • First aid • Workshop rules and regulations • Manufacturers service manual • Globe emission standards • Waste disposal	controlled fuel system • Work bench • Set of screw drivers • Tool kit • Vacuum tester • Engine analyzer • Wire brush • Fuel consumption meter • Air compressor • Air gun • Covering blankets • Fuel pressure gauge • Multimetre • Safety gears	
		(b) Servicing electronic fuel injection system	**Brainstorming:** Guide the students to explain the concept electronic fuel injection System	**The student should be able to:** • Use the service manual • Select tools and	Serviced electronic fuel injection system conforms to manufacturer's	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The	The following tools, equipment and safety gears are to be available: • Vehicle with	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			Practical work: Guide the students on how to maintain electronic fuel injection **Practical activity:** Organise the students in manageable groups to perform electronic fuel injection service	equipment • Service the electronic fuel control system • Test the fuel system • Observe safety precautions • Clean tools, equipment, and work place • Store tools, equipment, and parts	specifications	student should explain how to: • Diagnose components of the fuel system • Replace faulty injector nozzle/valves • Check fuel pressure regulator **Principles:** The student should explain the principles of: • Electronic fuel injection system **Theories:** The student should explain: • The components used in petrol electronic fuel injection system **Circumstantial knowledge:** **Detailed knowledge about:** • First aid • Workshop rules and regulations	petrol engine (carburetion system or fuel injection) • Vehicle with electronically controlled fuel system • Work bench • Set of screw drivers • Tool kit • Vacuum tester • Engine analyzer • Wire brush • Fuel consumption meter • Air compressor • Air gun • Covering blankets • Fuel pressure gauge • Multimetre • Gloves • Overall • Safety boots	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						• Manufacturers service manual • Globe emission standards • Waste disposal		
	2.2 Servicing natural gas fuel system	(a) Servicing LPG system components	**Brainstorming:** Guide students through brainstorming to describe the concepts and procedures for servicing LPG system components **Practical work:** Guide the students to maintain the LPG fuel system correctly **Practical activity:** Organise the students in manageable groups to service the LPG fuel system	**The student should be able to:** • Use the service manual • Select tools and equipment • Use a computer for checking LPG system functionality • Identify the LPG tank safety switch • Replace the LPG gas tank • Inspect the LPG gas leakages • Perform on-board diagnosis of air and LPG gas system components • Replace the defective LPG components • Observe safety precautions • Clean tools, instruments, equipment, and workplace	The serviced LPG system conforms to the manufacturer's guidelines	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Remove LPG gas tank • Check temperature sensors • Perform on-board diagnosis • Replace defective components **Principles:** The student should explain the principles involved in the operation and servicing of LPG gas injection system **Theories:** The student should	The following tools, equipment and safety gear are to be available: • Vehicle equipped with natural gas fuel system • Service Manual • Tool kit • Engine analyzer • Computer • Multimetre • Workbench • Welding machine • Safety gears	55

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
				• Store tools, equipment, and parts		explain: • Components used in LPG injection system • Characteristics of LPG **Circumstantial knowledge:** **Detailed knowledge about:** • First aid • Workshop rules and regulations • Manufacturers service manual • Globe emission standards • Waste disposal		
		(b) Servicing CNG system components	**Brainstorming:** Guide students through brainstorming to describe the concepts and procedures for servicing CNG system components **Practical work:** Guide the students on how to maintain and service the Compressed Natural Gas fuel system	**The student should be able to:** • Use the service manual • Select tools and equipment • Use a computer for checking CNG system functionality • Identify the CNG tank safety switch • Replace the CNG gas	Serviced CNG system according to manufacturer's guidelines	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Remove CNG gas tank • Check temperature sensors	The following tools, equipment and safety gears are to be available: • Vehicle equipped with natural gas fuel system • Service manual • Tool kit	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			Practical activity: Organise the students in manageable groups to service the CNG fuel system	tank • Inspect the CNG gas for leakages • Perform on-board diagnosis of air and CNG gas system components • Replace the CNG defective components • Observe safety precautions • Clean tools, instruments, equipment, and workplace • Store tools, equipment, and parts		• Perform on-board diagnosis • Replace defective CNG components **Principles:** The student should explain the principles of: • Servicing the CNG gas injection system **Theories:** The student should explain: • The components of the CNG injection system **Circumstantial knowledge:** **Detailed knowledge about:** • First aid • Workshop rules and regulations • Manufacturers service manual • Globe emission standards • Waste disposal	• Engine analyzer • Computer • Multimetre • Work bench • Safety gears	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
	2.3 Repairing diesel fuel system	(c) Servicing diesel supply system	**Brainstorming:** **ICT-based learning:** In small groups, guide students to use interactive simulation to visualise and explain the servicing of diesel fuel system **Hands-on activities**: Guide students through hands-on activities to demonstrate diesel fuel servicing **Practical activity:** Organise the students in manageable groups to perform servicing of diesel supply fuel system	**The student should be able to:** • Use the service manual • Select tools and equipment • Diagnose the components of diesel fuel system • Rectify high pressure diesel fuel pump • Rectify the diesel fuel injection nozzle • Replace the defective components. • Perform the injection timing • Observe safety precautions • Clean tools, instruments, equipment, and workplace • Store tools, equipment, and parts	Serviced diesel fuel system functions according to manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Perform on board diagnosis • Perform injection timing • Test injector nozzles • Bleed air from fuel system • Renew the timing belt • Perform phasing and calibration **Principles:** The student should explain the procedure for: • Servicing the components of the diesel fuel systems **Theories:** The student should explain: • Servicing of diesel	The following tools, equipment and safety gears are to be available: • Vehicle with diesel fuel engine • Video, power point simulation • Service manual • Fuel pressure testing equipment • Tool kit • Stoppers/wheel blocks • Injector nozzle testing machine • Injector pump testing machine • Containers for keeping parts • Vacuum gauge • Safety gears	57

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						fuel system and the properties of a diesel fuel • Use of service manual **Circumstantial knowledge:** **Detailed knowledge about:** • First aid • Workshop rules and regulations • Manufacturers service manual • Globe emission standards • Waste disposal		
		(d) Carrying out diesel smoke test	**Brainstorming:** Guide the students to define diesel smoke tests and regulations **Practical work:** Guide the students on how to perform diesel fuel engine smoke test **Practical activity:** Organise the students in manageable groups to perform a diesel fuel	**The student should be able to:** • Use the service manual • Select tools and equipment • Perform diesel fuel smoke test • Pre-test preparation • Test the environment • Test the procedure • Post test • Interpret the measurement	Serviced diesel fuel system functions according to the manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the methods for performing a diesel fuel engine smoke test • **Principles:** The student should explain the procedure for	The following tools, equipment and safety gears are to be available: • Vehicle with diesel engine • Service manual • Fuel pressure testing equipment • Tool kit • Stoppers/whee	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			engine smoke test	• Observe safety precautions • Clean tools, instruments, equipment, and workplace • Store tools, equipment, and parts		performing a diesel fuel engine smoke test **Theories:** The student should explain: • Methods for carrying out diesel fuel engine smoke test **Circumstantial knowledge:** **Detailed knowledge about:** • First aid • Workshop rules and regulations • Manufacturers service manual • Globe emission standards • Waste disposal	l blocks • Smoke opacity meter • Exhaust probe • Testing stand • Tachometer • Calibration gas/standards • Safety gears	
		(e) Checking and servicing common rail diesel fuel system	**Brainstorming:** Guide the students to define common rail diesel fuel system **Practical work:** Guide the students on how to maintain common	**The student should be able to:** • Use the service manual • Select tools and equipment • Diagnose the components of the common rail diesel fuel system	Serviced diesel fuel system functions according to the manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Service common	The following tools, equipment and safety gears are to be available: • Vehicle with diesel fuel engine • Service Manual	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			rail diesel fuel system **Practical activity:** Organise the students in manageable groups to perform service of common rail diesel fuel system	• Rectify the common rail pressure high-pressure fuel pump • Rectify the diesel fuel injection nozzle • Replace defective components of a common rail diesel fuel system • Perform injection timing • Observe safety precautions • Clean tools, instruments, equipment, and workplace • Store tools, equipment, and parts		rail diesel fuel system **Principles:** The student should explain the principles involved in: • Servicing diesel fuel system **Theories:** The student should explain the: • Procedure for carrying out services of common rail diesel fuel system **Circumstantial knowledge:** **Detailed knowledge about:** • First aid • Workshop rules and regulations • Manufacturers service manual • Globe emission standards • Waste disposal	• Fuel pressure testing equipment • Tool kit • Stoppers/wheel blocks • Injector nozzle testing machine • Injector pump testing machine • Containers for keeping parts • Vacuum gauge • Safety gears	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
3.0 Maintaining emission control system	3.1 Servicing catalytic converter	(a) Inspecting catalytic converter	**Brainstorming:** Guide the students to define a catalytic converter **Practical work:** Guide the students on how to inspect catalytic converter **Practical activity:** Organise the students in manageable groups to perform	**The student should be able to:** • Use the service manual • Select tools and equipment • Check catalytic converter • Test catalytic converter • Replace catalytic converter • Clean tools, equipment and workplace • Store tools and equipment	Catalytic converter serviced as per manufacturer's service manual	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The students should explain how to: • Check catalytic and test catalytic converter **Principles:** The student should explain the principles for: • Inspecting catalytic converter **Circumstantial knowledge** **Detailed knowledge about:** • Safety precautions while servicing catalytic converter • Handling of tools and equipment	The following tools, equipment and safety gears are to be available: • Service Manual	67
		(b) Repairing catalytic	**Brainstorming:** Guide the students to:	**The student should be able to:**	Catalytic converter serviced	**Knowledge evidence:**	The following tools, equipment and	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
		converter	define a catalytic converter **Practical work:** Guide the students on how to repair a catalytic converter **Practical activity:** Organise the students in manageable groups to perform the repair of a catalytic converter	• Use the service manual • Select tools and equipment • Check the catalytic converter • Repair the catalytic converter • Test the catalytic converter • Replace the catalytic converter • Clean tools, equipment, and workplace • Store tools and equipment	as per manufacturer's service manual	**Detailed knowledge of:** **Method used:** The students should explain how to: • Repair catalytic converter **Principles:** The student should explain the principles of: • Repairing catalytic converter **Theories:** The student should explain: • The procedure for repairing various catalytic converter **Circumstantial knowledge** **Detailed knowledge about:** • Safety precautions while servicing catalytic converter • Handling of tools and equipment	safety gears are to be available: • Service Manual • Tool kit • Pipe cutter • Air compressor • Exhaust gas analyzer • Safety gears	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
	3.2 Servicing oxygen sensor	(a) Inspecting oxygen sensor	**Brainstorming:** Guide the students to define the oxygen sensor **Practical work:** Guide the students on how to inspect the oxygen sensor **Practical activity:** Organise the students in manageable groups to perform an inspection of the oxygen sensor	**The student should be able to:** • Use the service manual • Select tools and equipment • Check the oxygen sensor • Testing the oxygen sensor • Clean tools, equipment, and workplace • Store tools and equipment	The oxygen sensor serviced as per the manufacturer's service manual	**Knowledge evidence:** **Detailed knowledge of**: **Method used:** The student should explain how to: • Check oxygen sensor **Principles:** The student should explain the principles of: • Checking oxygen sensor **Theories:** The student should explain: • The procedure for testing the oxygen sensor **Circumstantial knowledge** **Detailed knowledge about:** • First aid • Workshop rules and regulations • Manufacturers service manual • Globe emission standards	The following tools, equipment and safety gears are to be available: • Service Manual • Motor vehicle with catalytic converter • Tool kit • Multimetre • Scan tool • Exhaust gas analyzer • Torque wrench • Oxygen Sensor installation tool • Air compressor • Safety gears	26

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						• Waste disposal		
		(b) Replacing an oxygen sensor	**Brainstorming:** Guide the students to define the oxygen sensor **Practical work:** Guide the students on how to replace the oxygen sensors correctly **Practical activity:** Organise the students in manageable groups to perform the replacement of the oxygen sensor	**The student should be able to:** • Use the service manual • Select tools and equipment • Check the oxygen sensor • Replace the oxygen sensor • Test the oxygen sensor • Clean tools, equipment, and workplace • Store tools and equipment	Oxygen sensor replaced as per manufacturer's service manual	**Knowledge evidence:** **Detailed knowledge of**: **Method used:** The students should explain how to: • Replace oxygen sensor **Principles:** The student should explain the principle of: • Replacing oxygen sensor **Theories:** The student should explain: • The procedure for replacing faulty oxygen sensor **Circumstantial knowledge** **Detailed knowledge about:** • First aid • Workshop rules and regulations	The following tools, equipment and safety gears are to be available: • Service Manual • Motor vehicle with catalytic converter • Tool kit • Multimetre • Scan tool • Exhaust gas analyzer • Torque wrench • Sensor installation tool • Air compressor • Overall • Safety boot • Gloves • Safety clear glasses	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						• Manufacturer's service manual • Globe emission standards • Waste disposal		
	3.3 Repairing exhaust system	(a) Repairing mufflers	**Brainstorming:** Guide the students to define mufflers **Practical work:** Guide the students on how to repair exhaust mufflers **Practical activity:** Organise the students in manageable groups to perform repairing of exhaust mufflers	**The student should be able to:** • Use the service manual • Select tools and equipment • Check leakages and damage of the muffler • Rectify the damaged muffler • Test the muffler • Clean tools, equipment, and workplace • Store tools and equipment	The muffler was repaired as per the manufacturer's service manual	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The students should explain how to: • Repair exhaust mufflers **Principles:** The student should explain the principles of: • Repairing exhaust mufflers exhaust **Theories:** The student should explain: • The procedure for repairing exhaust mufflers **Circumstantial knowledge**	The following tools, equipment and safety gear are to be available: • Service Manual • Motor vehicle with an exhaust muffler • Tool kit • Scan tool • Exhaust gas analyzer • Pipe cutter • Safety gears	66

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						Detailed knowledge about: • First aid • Workshop rules and regulations • Manufacturer's service manual • Globe emission standards • Waste disposal		
		(b) Replacing exhaust system components	**Brainstorming:** Guide the students to define the exhaust system **Practical work:** Guide the students on how to replace the exhaust system components **Practical activity:** Organise the students in manageable groups to perform exhaust system replacement	**The student should be able to:** • Use the service manual • Select tools and equipment • Check leakages and damage of the exhaust pipe • Rectify the exhaust pipe • Replace the exhaust pipe if it is beyond repair • Test the exhaust pipe • Clean tools, equipment, and workplace • Store tools and equipment	Exhaust system components were serviced as per the manufacturer's service manual	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The students should explain how to: • Replace exhaust system **Principles:** The student should explain the principles of: • Replacing exhaust system **Theories:** The student should explain: • The procedure for replacing the exhaust system	The following tools, equipment and safety gear is to be available: • Service Manual • Motor vehicle with exhaust system • Tool kit • Scan tool • Exhaust gas analyzer • Pipe cutter • Safety gears	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						Circumstantial knowledge **Detailed knowledge about:** • First aid • Workshop rules and regulations • Manufacturers service manual • Globe emission standards • Waste disposal		
4.0 Maintaining engine enhancing	4.1 Servicing super charger	(a) Servicing mechanical driven super-charger	**Brainstorming:** Guide the students to define mechanical-driven super charger **Practical work:** Guide the students on how to service the mechanical-driven super charger correctly **Practical activity:** Organise the students in manageable groups to perform servicing of mechanically driven supercharger	**The student should be able to:** • Select tools, equipment, and safety gears • Troubleshoot the supercharging system • Service mechanical the driven super-charger • Test the super-charging system • Observe safety precautions • Clean tools, equipment and workplace • Store tools and equipment	Serviced mechanical driven super-charger conforms to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **The method used:** The student should explain the work sequence on how to service mechanically driven super-chargers **Principles:** The student should explain the principles of: • Servicing mechanical driven superchargers	The following tools, equipment and safety gears are to be available: • Gasoline engine with super-charger • Super charger kit • Tachometer • Dial indicator • Multi meters • Work bench • Tool kit • Torque wrench • Workbench light • Safety gears	31

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						Theories: The student should explain: • The procedure for servicing mechanical driven super charger's system **Circumstantial knowledge** **Detailed knowledge about:** • First aid • Workshop rules and regulations • Manufacturers service manual • Waste disposal		
		(b) Servicing electrical driven super-charger	**Brainstorming** Guide the students to define electrical driven supercharger **Practical work:** Guide the students on how to service an electrical-driven supercharger **Practical activity:** Organise the students in	**The student should be able to:** • Select tools, equipment, and safety gears • Troubleshoot the supercharging system • Service the electrically driven super-charger • Test the super-charging system • Observe safety precautions	Serviced electrical driven super-charger conforms to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **The method used:** The student should explain the work sequence on how to service an electrical-driven super-charger **Principles:** The student should	The following tools, equipment and safety gears are to be available: • Gasoline engine with electrical driven super-charger • Tachometer • Dial indicator • Multimetre	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			manageable groups to perform service on an electrical-driven super charger	• Clean tools, equipment, and workplace • Store tools and equipment		explain the principles of: • Servicing an electrically driven supercharger • **Theories:** The student should explain: • The procedure for servicing electrical driven super charge **Circumstantial knowledge** **Detailed knowledge about:** • First aid • Workshop rules and regulations • Manufacturers service manual • Waste disposal	• Work bench • Tool kit • Torque wrench • Work bench light • Safety gears	
		(c) Repairing the super charger	**Brainstorming** Guide the students to define the supercharger **Practical work:** Guide the students on how to repair the supercharger	**The student should be able to:** • Select tools, equipment, and safety gears • Troubleshoot the supercharging system • Repair the super-charger	The repaired super charger conforms to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the work sequence on how to	The following tools, equipment and safety gears are to be available: • Gasoline engine with super-charger • Tachometer	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			Practical activity: Organise the students in manageable groups to perform repairing of supercharger	• Test the super-charging system • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment		repair super-chargers **Principles:** The student should explain the principles for: • Repairing different superchargers • **Theories:** The student should explain: • The procedure for repairing different superchargers **Circumstantial knowledge** **Detailed knowledge about:** • First aid • Workshop rules and regulations • Manufacturers service manual • Waste disposal	• Dial indicator • Multimetre • Work bench • Tool kit • Torque wrench • Workbench light • Safety gears	
		(d) Carrying out service/repair of heat exchanger	**Brainstorming:** Guide the students to define the heat exchanger **Practical work:** Guide the students on	**The student should be able to:** • Select tools, equipment, and safety gears • Troubleshoot the heat exchanger	Serviced super-charging system functions according to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should	The following tools, equipment and safety gears are to be available: • Diesel /Gasoline	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			how to repair the heat exchanger **Practical activity:** Organise the students in manageable groups to perform repairing of heat exchanger	• Repair the heat exchanger • Test super-charging system • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment		explain the work sequence on how to repair heat exchanger. **Principles:** The student should explain the principles of: • Repairing heat exchanger. **Theories:** The student should explain the procedure for repairing heat exchanger **Circumstantial knowledge** **Detailed knowledge about:** • Safety precautions while servicing supercharging system • Safe handling of work tools and equipment	engine with heat exchanger • Tachometer • Dial indicator • Multimetre • Work bench • Tool kit • Torque wrench • Workbench light • Safety gears	
	4.2 Overhauling turbo charger	(a) Dismantling turbo charger	**Brainstorming** Guide the students to define the turbo charger	**The student should be able to:** • Select tools, equipment, and safety gears	Dismantled turbo charger conforms to technical specifications	**Knowledge evidence:** **Detailed knowledge of:**	The following tools, equipment and safety gears are to be available:	32

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			Practical work: Guide the students on how to dismantle the turbo charger **Practical activity:** Organise the students in manageable groups to perform turbo charger dismantling	• Dismantle the turbo-charger • Check the turbine shaft end play and radial play • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment		**Method used:** The student should explain how to overhaul turbo-chargers **Principles:** The student should explain the principles of: • Turbo-chargers dismantling **Theories:** The student should explain: • The procedure for carrying out turbo chargers dismantling • **Circumstantial knowledge Detailed knowledge about:** • First aid • Workshop rules and regulations • Manufacturers service manual • Waste disposal	• Turbo-charger • Tachometer • Dial indicator • Work bench • Tool kit • Torque wrench • Workbench light • Oil can • Safety gears	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
		(b) Servicing /replacing faulty turbo charger components	**Brainstorming:** Guide the students to define fault components **Practical work:** Guide the students to perform repairing of fault components **Practical activity:** Organise the students in manageable groups to perform repairing of fault components	**The student should be able to:** • Select tools, equipment, and safety gears • Dismantle the turbo-charger • Service the turbo-charger • Replace the faulty components • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment	Serviced turbo-charged conforms to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** • **Method used:** The student should explain how to replace turbo charger fault component • **Principles:** The student should explain the principles governing replacement of turbocharger fault components **Theories:** The student should explain: • The procedure for replacing fault component of turbo chargers • **Circumstantial knowledge** • **Detailed knowledge about:** • First aid • Workshop	The following tools, equipment and safety gears are to be available: • Turbo-charger • Turbo charger service kit • Tachometer • Work bench. • Tool kit • Torque wrench • Workbench light • Safety gears	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						rules and regulations • Manufacturers service manual • Waste disposal		
		(c) Assembling turbo-charger	**Brainstorming:** Guide the students to define the turbo charger assembling **Practical work:** Guide the students to assemble the turbo charger **Practical activity:** Organise the students in manageable groups to perform turbo charger assembling	**The student should be able to:** • Select tools, equipment, and safety gears • Dismantle the turbo-charger. • Check the turbine shaft end play and radial play • Replace the faulty components • Assemble the turbo-charger. • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment	Assembled turbo-charged conforms to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to assemble turbo-chargers **Principles:** The student should explain the principles for: • Assembling turbo-chargers • **Theories:** The student should explain: • The procedure for assembling turbo charger **Circumstantial knowledge** **Detailed knowledge about:** • First aid • Workshop	The following tools, equipment and safety gears are to be available: • Turbo-charger • Turbo charger service kit • Tachometer • Work bench • Tool kit • Torque wrench • Workbench light • Safety gears	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						rules and regulations • Manufacturers service manual • Waste disposal		
		(d) Testing turbocharger	**Brainstorming:** Guide the students to define turbo charger testing **Practical work:** Guide the students on the method of testing super charger **Practical activity:** Organise the students in manageable groups to perform turbo charger testing	**The student should be able to:** • Select tools, equipment, and safety gears • Dismantle the turbo-charger • Check the turbine shaft end play and radial play • Replace the faulty components • Assemble the turbo-charger. • Test the performance of the turbocharger • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment	Tested turbo-charged conforms to technical specifications and procedures	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the testing procedure for turbo-chargers **Principles:** The student should explain the principles of: • Turbo charger testing **Theories:** The student should explain: • The procedure for carrying out turbo charger testing **Circumstantial knowledge** **Detailed knowledge about:** • First aid	The following tools, equipment and safety gears are to be available: • Turbo-charger • Motor vehicle designed to operate with turbo charger or Turbo charger testing bench • Work bench • Tool kit • Torque wrench • Workbench light • Safety gears	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						• Workshop rules and regulations • Manufacturers service manual • Waste disposal		
	4.3 Servicing exhaust gas recirculation system	(a) Servicing EGR heat exchanger	**Brainstorming:** Guide the students to define Exhaust Recirculation Gas (ERG) **Practical work:** Guide the students on how to service the ERG heat exchanger **Practical activity:** Organise the students in manageable groups to perform service of the ERG heat exchanger	**The student should be able to:** • Select tools, equipment, and safety gears • Service the EGR heat exchanger • Test the performance of the components • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment	Serviced Exhaust Gas Recirculation system components meet the required technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to service Exhaust Gas Recirculation system components. **Principles:** The student should explain the principles of: • EGR system servicing • **Theories:** The student should explain: • The procedure for servicing the EGR system • **Circumstantial knowledge** **Detailed knowledge**	The following tools, equipment and safety gears are to be available: • Diesel engine • Work bench • Tool kit • Torque wrench • Work bench light • Air compressor • Safety gears	32

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						about: • First aid • Workshop rules and regulations • Manufacturers service manual • Waste disposal		
		(b) Servicing EGR cooler	**Brainstorming:** Guide the students to define the Exhaust Gas Recirculation cooler (EGR) **Practical work:** Guide the students to service the Exhaust Gas Recirculation cooler (EGR) **Practical activity:** Organise the students in manageable groups to perform servicing of the Exhaust Gas Recirculation (EGR) cooler	**The student should be able to:** • Select tools, equipment, and safety gears • Service the EGR cooler • Test the components' performance • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment • Clean tools, equipment, and workplace • Store tools and equipment	Serviced Exhaust Gas Recirculation cooler conforms to technical specifications.	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to service the Exhaust gas Recirculation system (EGR) cooler **Principles:** The student should explain the principles of: • Servicing EGR **Theories:** The student should explain: • The procedure for servicing the EGR system	This element can be achieved at a school training workshop. The following tools, equipment and safety gears are to be available: • Diesel engine • EGR cooler kit • Work bench • Tool kit • Torque wrench • Work bench light • Air compressor • Safety gears	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						Circumstantial knowledge **Detailed knowledge about:** • First aid • Workshop rules and regulations • Manufacturers service manual • Globe emission standards • Waste disposal		
		(c) Servicing the EGR Mixer	**Brainstorming:** Guide the students to define the EGR mixer and identify its main function **Practical work:** Guide the students on how to service the EGR mixer correctly **Practical activity:** Organise the students in manageable groups to perform the service of the EGR mixer	**The student should be able to:** • Select tools, equipment, and safety gears • Service the EGR Mixer • Test the components' performance • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment	Serviced Exhaust Gas Recirculation mixer conforms to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to service the Exhaust gas Recirculation system (EGR) Mixer. **Principles:** The student should explain the principles of: Servicing the EGR system • **Theories:**	This element can be achieved at a school training workshop. The following tools, equipment and safety gears are to be available: • Diesel/Gasoline engine • Work bench • Tool kit • Torque wrench • Workbench light • Air compressor • Safety gears	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						The student should explain: • The procedure for carrying out the service of the EGR system • **Circumstantial knowledge Detailed knowledge about:** • First aid • Workshop rules and regulations • Manufacturers service manual • Globe emission standards • Waste disposal		
		(d) Servicing butterfly valve	**Brainstorming:** Guide the students to define the butterfly valve **Practical work:** Guide the students on how to service the butterfly valve **Practical activity:** Organise the students in manageable groups to	**The student should be able to:** • Select tools, equipment, and safety gears • Service butterfly valve /replace ECM and MAF sensors • Test the components' performance • Observe safety precautions	The serviced butterfly valve meets the required technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to service Exhaust butterfly valve system components **Principles:** The student should	This element can be achieved at a school training workshop. The following tools, equipment and safety gears are to be available: • Diesel /Gasoline engine • Work bench	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			perform servicing of a butterfly valve	• Clean tools, equipment, and workplace • Store tools and equipment		explain the standards for servicing the butterfly valve **Theories:** The student should explain the procedure for: • Servicing butterfly valve system. **Circumstantial knowledge** **Detailed knowledge about:** • First aid • Workshop rules and regulations • Manufacturers service manual • Globe emission standards • Waste disposal	• Tool kit • Torque wrench • Penetrant • Cotton rags • Work bench light • Air compressor • Safety gears	
	4.4 Servicing engine retarders	(a) Servicing engine exhaust brakes	**Brainstorming:** Guide the students to define engine exhaust brake **Practical work:** Guide the students on how to service engine exhaust brake	**The student should be able to:** • Select tools, equipment, and safety gears • Service the engine exhaust brakes • Check and replace wastegate	The serviced engine exhaust brake meets the required technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to service engine	This element can be achieved at a school training workshop. The following tools, equipment and safety gear are to be available: • Diesel engine	21

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			Practical activity: Organise the students in manageable groups to perform servicing of engine exhaust brake	• Test the performance of the components • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment •		exhaust brake (Retarders) and components **Principles:** The student should explain the principles of: • Servicing engine exhaust brake system (Retarders) Components **Theories:** The student should explain: • The procedure for servicing engine exhaust brake system component **Circumstantial knowledge** **Detailed knowledge about:** • First aid • Workshop rules and regulations • Manufacturers service manual • Globe emission standards	• Workbench • Tool kit • Torque wrench • Workbench light • Air compressor • Safety gears	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						Waste disposal		
		(b) Servicing hydraulic retarding device	**Brainstorming:** Guide the students to define hydraulic retarder **Practical work:** Guide the students to service hydraulic retarder **Practical activity:** Organise the students in manageable groups to perform service for hydraulic retarder	**The student should be able to:** • Select tools, equipment, and safety gears • Service hydraulic retarding devices • Test the performance of the components • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment •	Serviced hydraulic retarding device meets the required technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to service hydraulic retarders (engine retarders) and components **Principles:** The student should explain the principles of: • Servicing hydraulic retarding device • **Theories:** The student should explain: • The procedure for carrying out hydraulic retarding device **Circumstantial knowledge**	The following tools, equipment and safety gears are to be available: • Diesel engine • Work bench • Tool kit • Torque wrench • Work bench light • Air compressor • Safety gears	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						Detailed knowledge about: • First aid • Workshop rules and regulations • Manufacturers service manual • Globe emission standards • Waste disposal		
		(c) Servicing compression release retarders	**Brainstorming:** Guide the students to define compression release retarder **Practical work:** Guide the students to service compression release retarder **Practical activity:** Organise the students in manageable groups to perform servicing of compression release retarder	**The student should be able to:** • Select tools, equipment, and safety gears • Service the engine exhaust brakes • Service the compression release retarder • Test the performance of the components • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment •	Serviced compression release retarders meet the required technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to service a compression release retarder system component **Principles:** The student should explain the principles for: • Servicing compression release retarder. **Theories:**	The following tools, equipment and safety gears are to be available: • Diesel engine • Work bench • Tool kit • Torque wrench • Work bench light • Air compressor • Safety gears	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						The student should explain: • The procedure for carrying out compression release retarder **Circumstantial knowledge** **Detailed knowledge about:** • First aid • Workshop rules and regulations • Manufacturers service manual • Globe emission standards • Waste disposal		
		(d) Repairing electric retarding device	**Brainstorming:** Guide the students to define an electric retarder **Practical work:** Guide the students to repair an electric retarder correctly **Practical activity:** Organise the students in manageable groups to	**The student should be able to:** • Select tools, equipment, and safety gears • Check the electric retarding components • Service the electric retarding devices • Test the performance of the components • Observe safety	Serviced Electric Retarding devices meet required technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to repair electric retarders and components **Principles:** The student should	The following tools, equipment and safety gear are to be available: • Diesel engine • Workbench • Tool kit • Torque wrench • Workbench light • Air compressor	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			perform repairing of an electric retarding device	precautions • Clean tools, equipment, and workplace • Store tools and equipment •		explain the principles of: • Repairing an electric retarder **Theories:** The student should explain: • The procedure for repairing an electric retarder **Circumstantial knowledge Detailed knowledge about:** • First aid • Workshop rules and regulations • Manufacturers service manual • Globe emission standards • Waste disposal	• Safety goggles • Overall • Safety boots • Gloves	
		(e) Servicing engine braking by fuel cut-off retarder	**Brainstorming:** Guide the students to brainstorm theengine braking by fuel cut-off retarder **Practical work:** Guide the students on	**The student should be able to:** • Select tools, equipment, and safety gears • Check the components of the engine braking by fuel cut-off retarder	Serviced Engine Braking by Fuel Cut-Off retarder components meet required technical specifications	**Knowledge evidence: Detailed knowledge of: Method used:** The student should explain how to service engine	The following tools, equipment and safety gear are to be available: • Diesel engine • Workbench • Tool kit	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			how to service an engine braking by fuel cut-off retarder **Practical activity:** Organise the students in manageable groups to perform servicing of engine brake by fuel cut-off retarder	• Service engine braking by fuel cut-off retarding devices • Check and replace sensors • Test the performance of the components • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment •		braking by fuel cut-off retarders **Principles:** The student should explain the principles of: • Servicing an engine braking by fuel cut-off retarder **Theories:** The student should explain: • The procedure for servicing an engine braking by fuel cut-off retarder **Circumstantial knowledge** **Detailed knowledge about:** • First aid • Workshop rules and regulations • Manufacturers service manual • Globe emission standards • Waste disposal •	• Torque wrench • Workbench light • Air compressor • Safety gears	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
		(f) Checking and servicing breathing circuit sensors	**Brainstorming:** Guide the students to define breathing circuit sensors **Practical work:** Guide the students on how to check a breathing circuit sensor **Practical activity:** Organise the students in manageable groups to perform checking of breathing circuit sensors	**The student should be able to:** • Select tools, equipment, and safety gears • Service breathing circuit sensors • Check and replace sensors • Test the performance of the components • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment •	Checked servicing breathing circuit sensors conforms to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to check the breathing circuit sensor components. **Principles:** The student should explain the principles of: • Checking and servicing breathing circuit sensor **Theories:** The student should explain: • The technique for checking a breathing circuit sensor **Circumstantial knowledge** **Detailed knowledge about:** • First aid • Workshop	The following tools, equipment and safety gears are to be available: • Diesel engine • Work bench • Multimetre • Tool kit • Torque wrench • Work bench light • Safety gears	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						rules and regulations • Manufacturers service manual • Globe emission standards • Waste disposal		
5.0 Maintain power transmission system	5.1 Maintaining clutch systems	(a) Servicing clutch components	**Brainstorming:** Guide the students to describe the clutch components. **Practical work:** Guide the students on how to service the clutch components. **Practical activity:** Organise the students in manageable groups to service clutch component	**The student should be able to:** • Use the service manual • Select tools and equipment • Remove the clutch from the engine • Inspect release bearing and fork levers • Clean the clutch assembly • Inspect the clutch assembly • Dismantle the clutch • Service the clutch components • Check the flywheel and pilot bearing • Assemble the clutch Test the clutch performance • Observe safety precautions • Clean tools and parts	Serviced clutch functions according to manufacturer's standards	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Service the clutch system components **Principles:** The student should explain the principles of: • Servicing the clutch system components • **Theories:** The student should explain: • The techniques for servicing the clutch system components	The following tools, equipment and safety gears are to be available: • Vehicle • Work bench • Tool kit • Hydraulic press • Steel rule • Feeler gauge • Straight edge bar • Clutch aligning tool • Wheel blocks • Surface plate • Safety gears	62

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						Circumstantial knowledge: **Detailed knowledge about:** • First aid • Safety precautions • Manufacturers service manual • Waste disposal		
		(b) 5.1.2 Servicing clutch master cylinder	**Brainstorming:** Guide the students to define the clutch master cylinder **Practical work:** Guide the students on how to service the clutch master cylinder **Practical activity:** Organise the students in manageable groups to perform servicing of the clutch master cylinder	**The student should be able to:** • Use the service manual • Select tools and equipment • Remove the clutch master cylinder • Inspect the clutch master cylinder assembly • Test the clutch performance • Observe safety precautions • Clean tools and workplace • Store tools, equipment, and parts	Serviced clutch master cylinder functions according to manufacturer's standards	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Service clutch master cylinder **Principles:** The student should explain the principles of: • Servicing clutch master cylinder **Theories:** The student should explain: • The techniques for undertaking	The following tools, equipment and safety gears are to be available: • Vehicle • Work bench • Tool kit • Hydraulic press • Feeler gauge • Clutch aligning tool • Clutch brake fluid • Clutch repair kit • Wheel blocks • Surface plate • Safety gears	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						clutch master cylinder servicing **Circumstantial knowledge:** **Detailed knowledge about:** • First aid • Safety precautions • Manufacturers service manual • Waste disposal		
		(c) 5.1.3 Servicing the slave cylinder	**Brainstorming:** Guide the students to define the clutch slave cylinder **Practical work:** Guide the students on how to service the clutch slave cylinder **Practical activity:** Organise the students in manageable groups to perform the servicing of the clutch slave cylinder	**The student should be able to:** • Use the service manual • Select tools and equipment • Remove the slave cylinder • Inspect the slave cylinder • Service the slave cylinder • Test the slave cylinder performance • Observe safety precautions • Clean tools and workplace	Serviced clutch slave cylinder functions according to manufacturer's standards	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Service clutch slave cylinder **Principles:** The student should explain the principles of: • Servicing clutch slave cylinder **Theories:** The student should	The following tools, equipment and safety gears are to be available: • Vehicle • Work bench • Tool kit • Brake slave cylinder repair kit • Brake fluid • Automatic brake fluid bleeder • Hydraulic press • Clutch aligning tool • Wheel blocks	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
				• Store tools, equipment, and parts		explain: • The techniques for undertaking clutch slave cylinder servicing **Circumstantial knowledge:** **Detailed knowledge about:** • First aid • Safety precautions Manufacturers service manual • Waste disposal	• Surface plate • Safety gears	
	5.2 Maintaining manual gearboxes	(a) Overhauling main gearbox	**Brainstorming:** Guide the students to define a gearbox **Practical work:** Guide the students on how to overhaul a gearbox **Practical activity:** Organise the students in manageable groups to perform an overhauling of a gearbox	**The student should be able to:** • Use the service manual • Select tools and equipment • Dismantle the main gearboxes • Clean the parts • Examine the parts • Replace the defective parts • Reassemble the gearbox • Refill the gearbox oil	Gearbox overhauled according to manufacturer's guidelines	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Overhaul gearbox **Principles:** The student should explain the principles of: • Overhauling gearbox **Theories:** The	The following tools, equipment and safety gear are to be available: • Manual gearbox • Tool kit • Waste oil container • Plastic hammer • Set of Pullers • Hoist or service pit • Tyre lever • Workbench	103

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
				• Test the gearbox • Observe safety precautions • Clean tools and workplace • Store tools, equipment, and parts		student should explain: • The techniques for overhauling the gearbox **Circumstantial knowledge:** **Detailed knowledge about:** • First aid • Safety precautions Manufacturers service manual • Waste disposal	• Service Manual • Oil can • Cooking stove • Steel pan • Gearbox rotating stand • Transmission jack • Torque wrench • Vernier calliper • External micrometres • Feeler gauge • Safety gears	
		(b) Overhauling auxiliary gearbox	**Brainstorming:** Guide the students to define the auxiliary gearbox **Practical work:** Guide the students on how to overhaul the auxiliary **Practical activity:** Organise the students in manageable groups to perform auxiliary gearbox overhauling	**The student should be able to:** • Use the service manual • Select tools and equipment • Dismantle the auxiliary gearboxes • Clean the parts • Examine the parts • Replace the defective parts • Reassemble the auxiliary gearboxes • Observe safety precautions	Gearbox overhauled according to manufacturer's guidelines	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to perform auxiliary gearbox overhauling **Principles:** The student should explain the principles of: • Servicing auxiliary gearbox	The following tools, equipment and safety gears are to be available: • Manual gearbox • Tool kit • Waste oil container • Plastic hammer • Set of Pullers • Hoist or service pit • Tyre lever • Work bench • Service manual	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
				• Clean tools and workplace • Store tools, equipment, and parts		**Theories:** The student should explain: • The techniques for overhauling the auxiliary gearbox **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions and regulations • Manufacturers service manual • Waste disposal	• Oil can • Cooking stove • Steel pan • Gearbox rotating stand • Transmission jack • Torque wrench. • Vernier calliper • External micrometres • Feeler gauge • Safety gears	
	5.3 Maintain final drive unit	(a) Servicing final drive components	**Brainstorming:** Guide the students to define the final drive **Practical work:** Guide the students on how to service final drive components **Practical activity:** Organise the students in manageable groups to perform servicing of the final drive	**The student should be able to:** • Use the service manuals • Select tools and equipment • Dismantle the final drive • Replace the defective final drive components • Service the differential locks • Reassemble the final	Final drive serviced to meet manufacturer's specifications.	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Service the final drive components **Principles:** The student should explain the principles of: • Servicing the	The following tools, equipment and safety gears are to be available: • Final drive unit • Tool kit • Workbench • Bench vice • Final drive unit stand • Dial gauge • Service Manual • Spring scale • Pinion depth	63

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
				drive unit • Test the final drive unit • Observe safety precautions • Clean tools, equipment, and workplace • Store tools, equipment, and parts		final drive components **Theories:** The student should explain: • The procedure for servicing the final drive components **Circumstantial knowledge:** **Detailed knowledge about:** • First aid • Workshop rules and regulations • Manufacturers service manual • Waste disposal	gauge • Engineering blue • Brush • Set of Pullers • Rubber hammer • Feeler gauge • Sisal rope • Safety gears	
		(b) Checking crown wheel and pinion backlash	**Brainstorming:** Guide the students to define crown wheel and pinion backlash **Practical work:** Guide the students on how to check the crown wheel and pinion backlash **Practical activity:**	**The student should be able to:** • Use the service manuals • Select tools and equipment • Check the crown wheel and pinion for excessive play • Adjust the play • Test the play	Checked crown wheel and pinion backlash conforms to manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Inspect crown wheel and pinion for backlash	The following tools, equipment and safety gears are to be available: • Final drive unit • Tool kit • Work bench • Bench vice • Final drive unit stand • Dial gauge	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			Organise the students in manageable groups to perform crown wheel and pinion check	• Observe safety precautions • Clean tools, equipment, and work place • Store tools, equipment, and parts		**Principles:** The student should explain the principles of: • Checking crown wheel and pinion for backlash **Theories:** The student should explain: • The techniques for checking crown wheel and pinion backlash **Circumstantial knowledge:** **Detailed knowledge about:** • First aid • Workshop rules and regulations • Manufacturers service manual • Waste disposal	• Service manual • Spring scale • Pinion depth gauge • Engineering blue • Brush • Set of Pullers • Rubber hammer • Feeler gauge. • Sisal rope • Safety gears	
6.0 Maintaining simple hydraulic system and components	6.1 Diagnosing basic hydraulic system components	(a) Diagnose hydraulic system components	**Brainstorming:** Guide the students to define the Hydraulic system	**The student should be able to:** • Select tools and equipment • Identify all basic	Diagnosed hydraulic system faults are isolated as per the manufacturer's	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The	The following tools, equipment and safety gear are to be available: • Hydraulic	29

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			Practical work: Guide the students on how to diagnose the hydraulic system **Practical activity:** Organise the students in manageable groups to demonstrate the diagnosis of the hydraulic system	hydraulic system components • Diagnose the hydraulic system for malfunction • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment	technical manual	student should explain how to: • Diagnosis of hydraulic system components **Principles:** The student should explain the standards practice for diagnosing hydraulic system **Theories** The student should explain: • The practice for diagnosing hydraulic system components **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions • Manufacturers service manual First aid • Waste disposal	system simulator • Tool kit • Hydraulic pressure gauges • Hydraulic flow meters • Safety gears	
		(b) Troubleshoot hydraulic system	**Brainstorming:** Guide the students to explain the concept and	**The student should be able to:** • Select tools and	Troubleshoot hydraulic system and conforms to	• Safety precautions • Manufacturers	The following tools, equipment and safety gear are to be	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
		components	methods of troubleshooting hydraulic components **Practical work:** Guide the students on how to troubleshoot the hydraulic system **Practical activity:** Organise the students in manageable groups to perform hydraulic troubleshooting	equipment • Identify all basic hydraulic system components • Troubleshoot hydraulic system components • Observe safety precautions • Clean tool equipment and workplace • Store tools and equipment	the manufacturer's technical manual	service manual First aid • Waste disposal	available: • Hydraulic system simulator • Tool kit • Hydraulic pressure gauges • Hydraulic flow meters • Safety gears	
	6.2 Service basic hydraulic system components	(a) Service hydraulic system	Guide students through hands-on activities to service the hydraulic system	**The student should be able to:** • Select tools and equipment • Service the hydraulic system • Rectify/replace the faulty components • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment	Serviced hydraulic system and components conform to the manufacturer's technical manual	**Knowledge evidence:** **Detailed knowledge of:** **The method used:** The student should explain the services of the hydraulic system **Principles:** The principles of operation of a basic hydraulic system **Theories** The students should explain: • Basic Hydraulic system circuit **Circumstantial**	The following tools, equipment and safety gears are to be available: • Hydraulic system simulator • Hydraulic system components • Tool kit • Hydraulic pressure gauges • Hydraulic flow meters • Overall • Safety boots	40

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						knowledge: **Detailed knowledge about:** • Safety precautions in performing service of hydraulic system and components • Safe handling of work tools and equipment	• Gloves	
		(b) Servicing the hydraulic system components	Guide students through hands-on activities to service the hydraulic system components	**The student should be able to:** • Select tools and equipment • Service the hydraulic system • Rectify/replace the faulty components • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment	Serviced hydraulic system and components conform to the manufacturer's technical manual	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the services of the hydraulic system and components **Principles:** The principles of operation of basic hydraulic components **Theories** The students should explain: • Basic Hydraulic system	The following tools, equipment and safety gear are to be available: • Hydraulic system simulator • Hydraulic system components • Tool kit • Hydraulic pressure gauges • Hydraulic flow meters • Overall • Safety boots • Gloves	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						components **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions in performing service of hydraulic components. • Safe handling of work tools and equipment		

Form Four

Table 6: *Detailed Contents for Form Four*

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
1.0 Performing lathe machine operation	1.1 Performing turning	(a) Performing parallel turning	**Brainstorming:** Guide the students to define parallel turning **Practical work:** Guide the students on how to perform parallel turning **Practical activity:** Organise the students in manageable groups to perform parallel turning	**The student should be able to:** • Interpret drawings • Select tools and equipment • Select proper materials and tools • Take measurements • Cut the material to dimensions • Select speed, feed and depth of cut • Face workpiece • Centre drill workpiece. • Perform rough turning Perform turning to finish • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment	Machined workpiece conforms to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how parallel turning is performed **Principles:** The student should explain the principles of: • Performing parallel turning **Theories** The student should explain: • The procedure for performing parallel turning **Circumstantial**	The following tools, equipment and safety gears are to be available: • Lathe machine with accessories • Centre drill • Steel rule • Scriber • Hacksaw frame • Power hacksaw • Electrical power supply • Vernier calliper • Cotton gloves • Cutting tools • Depth gauge • Safety gears	48

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						knowledge: **Detailed knowledge about:** • Observe safety precautions while performing parallel turning • Safe handling of work tools, equipment and workpiece		
		(b) Performing taper turning	**Brainstorming:** Guide the students to define taper turning **Practical work:** Guide the students on how to perform taper turning **Practical activity:** Organise the students in manageable groups to perform taper-turning	**The student should be able to:** • Interpret drawings • Select tools and equipment • Select proper materials and tool • Take measurements • Cut the material to dimensions • Select speed, feed and depth of cut • Face workpiece • Centre drill workpiece • Perform rough	Machined workpiece conforms to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how taper turning is performed **Principles:** The student should explain the principles of: • Performing	The following tools, equipment and safety gears are to be available: • Lathe machine with accessories • Centre drill • Steel rule • Scriber • Hacksaw frame • Power hacksaw • Electrical power supply • Vernier calliper	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
				turning. • Perform turning finishing • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment		taper Turning **Theories:** The student should explain: • The procedure for performing taper turning **Circumstantial knowledge:** **Detailed knowledge about:** • Observe safety precautions while performing thread-cutting • Safe handling of work tools, equipment and workpiece	• Cotton gloves • Cutting tools • Depth gauge • Safety gears	
		(c) Performing knurling	**Brainstorming:** Guide the students to define knurling **Practical work:**	**The student should be able to:** • Interpret drawings • Select tools and equipment • Select proper	Machined workpiece conforms to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain	The following tools, equipment and safety gears are to be available: • Lathe machine with	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			Guide the students on how to perform knurling **Practical activity:** Organise the students in manageable groups to perform the knurling operation	materials and tool • Take measurements • Cut the material to dimensions • Select speed, feed and depth of cut • Face workpiece • Centre drill workpiece • Perform rough turning Perform turning to finish • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment		how knurling is performed **Principles:** The student should explain the principles of: • Performing knurling operation **Theories:** The student should explain: • The procedure for performing knurling **Circumstantial knowledge: Detailed knowledge about:** • Observe Safety precautions while performing knurling • Safe handling of work tools, equipment and workpiece	accessories • Centre drill • Vernier calliper • Micrometre • Steel rule • Thread plug gauge • Thread ring gauge • Thread pitch gauge • Depth gauge • Hacksaw • Power hacksaw • Electrical power supply • Safety gears	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
	1.2 Performing thread cutting	(a) Performing external thread cutting	**Brainstorming:** Guide the students to define external thread-cutting **Practical work:** Guide the students on how to perform external thread **Practical activity:** Organise the students in manageable groups to perform external threading	**The student should be able to:** • Interpret technical drawings • Select tools and equipment • Use lather machines • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment	Threaded workpiece conforms to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how external thread cutting is performed **Principles:** The student should explain the principles of: • Procedure for performing external threading **Theories:** The student should explain: • The techniques for performing external thread **Circumstantial knowledge:** **Detailed knowledge about:**	The following tools, equipment and safety gears are to be available: • Lathe machine with accessories • Centre drill • Vernier calliper • Micrometre • Steel rule • Thread plug gauge • Thread ring gauge • Thread pitch gauge • Depth gauge • Hacksaw • Power hacksaw • Electrical power supply • Overall • Safety boots • Cotton gloves • Safety clear glasses	48

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						• Observe safety precautions while performing thread-cutting • Safe handling of work tools, equipment and workpiece		
		(b) Performing internal thread cutting	**Brainstorming:** Guide the students to define internal thread cutting **Practical work:** Guide the students on how to perform internal thread-cutting **Practical activity:** Organise the students in manageable groups to perform external thread-cutting	**The student should be able to:** • Interpret technical drawings • Select tools and equipment • Use lather machines • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment	Internal threaded workpiece conforms to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how internal thread cutting is performed **Principles:** The student should explain the principles of: • Cutting internal threads **Theories:** The student should explain: • Procedure for	The following tools, equipment, and safety gear should be available: • Lathe machine with accessories • Centre drill • Vernier calliper • Micrometre • Steel rule • Thread plug gauge • Thread ring gauge • Thread pitch gauge • Depth gauge • Hacksaw • Power hacksaw	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						cutting internal thread **Circumstantial knowledge:** **Detailed knowledge about:** • Observe Safety precautions while performing thread-cutting • Safe handling of work tools, equipment and workpiece	• Electrical power supply • Safety gears	
		(c) Performing imperial V-thread cutting	**Brainstorming:** Guide the students to explain the concept of imperial V thread cutting **Practical work:** Guide the students on how to perform imperial V thread-cutting **Practical activity:**	**The student should be able to:** • Interpret technical drawings • Select tools and equipment • Use lather machines • Observe safety precautions	Threaded workpiece conforms to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how imperial thread cutting is	The following tools, equipment and safety gears are to be available: • Lathe machine with accessories • Centre drill • Vernier calliper	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			Organise the students in manageable groups to perform imperial v-thread cutting	• Clean tools, equipment, and workplace • Store tools and equipment		performed **Principles:** The student should explain the principles of: • Cutting imperial v threads **Theories:** The student should explain: • The procedure for cutting imperial v thread **Circumstantial knowledge: Detailed knowledge about:** • Observe Safety precautions while performing thread-cutting • Safe handling of work tools, equipment, and workpiece •	• Micrometre • Steel rule • Thread plug gauge • Thread ring gauge • Thread pitch gauge • Depth gauge • Hacksaw • Power hacksaw • Electrical power supply • Safety gears	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
	1.3 Performing boring	(a) Performing drilling	**Brainstorming:** Guide the students to define drilling **Practical work:** Guide the students on how to perform drilling **Practical activity:** Organise the students in manageable groups to perform drilling	**The student should be able to:** • Interpret drawings • Select tools and equipment • Perform boring • Deburr workpiece • Observe safety precautions • Clean tools and equipment • Store tools and equipment	Workpiece bored according to given technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how drilling is performed on a lathe machine **Principles:** The student should explain the principles of: • Drilling **Theories:** The student should explain: The procedure for drilling a workpiece **Circumstantial knowledge:** **Detailed knowledge about:** • Observe safety requirements while boring on lathe	The following tools, equipment and safety gears are to be available: • Lathe machine with accessories • Vernier calliper • Depth gauge • Centre drill • Drill chuck • Safety boots • Cotton gloves • Safety clear glasses • Cap/Helmet • Safety gears	50

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						machine • Safe handling of work tools, equipment, and workpiece		
		(b) Performing reaming	**Brainstorming:** Guide the students to explain the concept of reaming **Practical work:** Guide the students on how to perform reaming **Practical activity:** Organise the students in manageable groups to perform reaming	**The student should be able to:** • Interpret drawings • Select tools and equipment • Perform boring • Deburr workpiece • Observe safety precautions • Clean tools and equipment • Store tools and equipment	Workpiece bored according to given technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how reaming is performed on a lathe machine **Principles:** The student should explain the principles of: • Performing reaming **Theories:** The student should explain: • The procedure for carrying out reaming **Circumstantial knowledge:**	The following tools, equipment and safety gears are to be available: • Lathe machine with accessories • Vernier calliper • Depth gauge • Centre drill • Drill chuck • Safety boots • Cotton gloves • Safety clear glasses • Cap/Helmet • Gloves • Overall	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						Detailed knowledge about: • Observe safety requirements while boring on the lathe machine • Safe handling of work tools, equipment, and workpiece		
2.0 Maintaining heating ventilation and air conditioning system	2.1 Servicing air conditioning system components	(a) Servicing air conditioning components	**Brainstorming:** Guide the students to define air conditioning **Practical work:** Guide the students on how to service air conditioning components **Practical activity:** Organise the students in manageable groups to perform air conditioning services	**The student should be able to:** • Use the service manual • Select tools and equipment • Identify the air conditioning main parts • Interpret air conditioning system circuits • Locate refrigerant leaks • Flush the system • Troubleshoot the air conditioning system • Recharge the refrigerant in the air conditioning system	Air conditioning system components serviced as per the manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Service air conditioning system **Principles:** The student should explain the principles of: • Servicing conditioning	The following tools, equipment and safety gears are to be available: • Service manual • Vehicle air conditioning model • Air condition service equipment unit • Tool kit • Clamp-on meter • Oxy-acetylene gas cylinders and accessories	79

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
				• Seal the refrigerant pipes by a gas welding • Test for leakage • Observe environmental and personal safety precautions • Clean tools, equipment, and workplace • Store tools, equipment, and parts		system components **Theories:** The student should explain: • Procedure for servicing air condition system components. **Circumstantial knowledge:** **Detailed knowledge about:** • Observe Safety precautions while servicing the air conditional system • Safe handling of work tools, equipment • Refrigerants • Waste disposal	• Junior hacksaw • Knife • Thermometer • Gas Leak detector • Vacuum pump. • Air blower • Hose pipe • Copper tube cutter • Air handling unit. • Tube flaring tool • Compound gauges • Mustimeter • Blazing rods and flux • Wire brush • Test lamp • Extension cable • Safety gears	
		(b) Recharging the refrigerant and oil	**Brainstorming:** Guide the students to	**The student should be able to:** • Use the service manual	Air conditioning system components	**Knowledge evidence:** **Detailed**	The following tools, equipment and safety gears are	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			explain the concept of recharging the refrigerant and oil **Practical work:** Guide the students on how to recharge the refrigerant in the air conditioning system **Practical activity:** Organise the students in manageable groups to perform air conditioning recharging	• Select tools and equipment • Identify the air conditioning main parts • Interpret the air conditioning system circuits • Locate the refrigerant leaks • Flush the system • Troubleshoot the air conditioning system • Recharge the refrigerant in the air conditioning system • Identify the method of refrigerant recovery • Seal the refrigerant pipes by a gas welding • Test for leakage • Observe environmental and personal safety precautions • Clean tools, equipment, and work place • Store tools, equipment, and parts	serviced as per manufacturer's specifications	**knowledge of:** **Method used:** The student should explain how to: • Recharge refrigerant and oil **Principles:** The student should explain the principles of: • Recharging refrigerant and oil in Air conditioning system **Theories:** The student should explain: The procedure for recharging refrigerant and oil in air condition system **Circumstantial knowledge:** **Detailed knowledge about:**	to be available: • Service manual • Vehicle air conditioning model • Air condition service equipment unit • Tool kit • Clamp-on meter • Oxy-acetylene gas cylinders and accessories • Junior hacksaw • Knife • Thermometer • Gas Leak detector • Vacuum pump • Air blower • Hose pipe • Copper tube cutter • Air handling unit • Tube flaring tool • Compound gauges • Multimetre	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						• Safety precautions in while servicing air conditional system • Safe handling of work tools, equipment, refrigerants • Waste refrigerant disposal	• Blazing rods and flux • Wire brush • Test lamp • Extension cable • Safety boots • Safety gears	
	2.2 Servicing air conditioning heating system components	(a) Servicing the heating system	**Think-ink-pair-share:** Guide students through the think-ink-pair-share strategy to discuss the concept of servicing air conditioning heating system **Interactive simulation:** Guide students through interactive simulation to discuss the methods for servicing air conditioning heating system **Practical activity:**	**The student should be able to:** • Use the service manual • Select tools and equipment • Identify the air conditioning main parts • Interpret the air conditioning system circuits • Locate the refrigerant leaks • Flush the system • Troubleshoot the air conditioning system • Recharge the	Air conditioning system components serviced as per the manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Service heating system **Principles:** The student should explain the principles of: • Servicing heating system **Theories:** The students should explain:	The following tools, equipment and safety gears are to be available: • Service manual • Vehicle air conditioning model • Air condition service equipment unit • Tool kit • Clamp-on meter • Oxy-acetylene gas cylinders and accessories • Junior hacksaw	79

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			Organise the students in manageable groups to demonstrate the procedure for servicing the air conditioning heating system	refrigerant in the air conditioning system • Seal the refrigerant pipes by a gas welding • Test for leakage • Observe environmental and personal safety precautions • Clean tools, equipment, and workplace • Store tools, equipment, and parts		• The procedure for carrying out the service of the heating system **Circumstantial knowledge:** **Detailed knowledge about:** • Observe safety precautions while servicing the air conditional system • Safe handling of work tools and equipment • Waste refrigerant disposal	• Knife • Thermometer • Gas Leak detector • Vacuum pump • Air blower • Hose pipe • Copper tube cutter • Air handling unit • Tube flaring tool • Compound gauges • Mustimeter • Blazing rods and flux • Wire brush • Test lamp • Extension cable • Safety gears	
		(b) Servicing heating system components	**Think-ink-pair-share:** Guide students through the think-ink-pair-share strategy to classify different components of the heating system	**The student should be able to:** • Clean the equipment • Interpret heating system diagrams • Perform visual	Serviced heating, ventilation system, and components conform to manufacturer's standards	**Knowledge evidence:** **Detailed knowledge of Method used:** The student should explain	The following tools, safety gears and equipment should be available: • An equipment with all heating, ventilation and	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			Interactive simulation: Guide students through interactive simulation to visualize and model the concepts and principles of servicing heating system components **Field visit:** Arrange field visits and guide the students to recognise and categorise the components of the heating system	inspection, identify system type, and application • Select proper tools • Diagnose and troubleshoot the heating and ventilation system and components • Service the heating and ventilation controls • Repair the heating and ventilation actuators • Service the heating and ventilation drive mechanism • Service the heating and ventilation fans • Repair the motors • Analyse the performance and function of heating, ventilation system, and components • Clean tools, working area, and the equipment • Store tools as required		how to • Rectify insufficient heat • Measure duct temperature **Principles:** The student should explain the principles used to repair the heating and ventilation systems and components **Theories:** The student should explain: • Heating and air conditioning operation • Functions of heating	air conditioning system components • Air compressor and hoses • Multimetre • Electronic • Video, multimedia • Service wire • Service manual • Safety boots • Overall • Clamp on meter • Helmet	
3.0	3.1 Servicing	(a) Performing	**Brainstorming:**	**The student should be**	Serviced	**Knowledge**	The following	87

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
Maintaining fuel injection system	electronically-controlled gasoline injection components	on-board diagnosis	Guide the students to explain the concept of on-board diagnosis **Practical work:** Guide the students on how to perform on-board diagnosis **Practical activity:** Organise the students in manageable groups to perform on-board diagnosis	**able to:** Use the service manual • Select tools and equipment • Perform on-board (OBD) diagnosis • Service electrical circuits and connections • Renew air and fuel filters • Perform mileage-based service • Inspect emission components • Interpret the fault codes • Test mechanical and electrical aspects • Observe safety precautions • Clean tools, equipment, and parts • Store tools and equipment	electronic controlled gasoline injection components conform to manufacturer's specifications	**evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to perform on board diagnosis for electronic controlled gasoline injection components. **Principles:** The student should explain the principles of: • Performing on board diagnosis for electronic fuel injection system components **Theories:** The student should explain: • Methods for performing on board diagnosis at an electronic	tools, equipment and safety gears are to be available: • Service manual • Electronic fuel injection vehicle • Compression tester • Pressure gauge • Tyre stoppers • Exhaust gas analyzer • Injector test bench • Scan tool • Tool kit • Diagnostic tester • Spark plug spanner • Tool kit • Oscilloscope • Multimetre • Safety gears	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						fuel injection system **Circumstantial knowledge** **Detailed knowledge about:** • Safety precautions while performing on board diagnosis for electronic controlled gasoline injection components • Safe handling of work tools • Equipment and Waste disposal		
		(b) Checking electronic fuel injection system components	**Brainstorming:** Guide the students to explain the concept of an electronic fuel injection system	**The student should be able to:** • Use the service manual • Select tools and equipment	Serviced electronic controlled gasoline injection components conform to	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student	This element can be achieved at a school training workshop. The following tools, equipment and safety gears are	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			Practical work: Guide the students on how to perform checks on electronic fuel injection system components **Practical activity:** Organise the students in manageable groups to perform checks on electronic fuel injection system components	• Check the electric fuel pump circuit • Check the cold start injector valve • Check injector pressure • Check pressure regulator • Service throttle valve body • Check sensor circuit • Check Electronic Control Unit (ECU) • Observe safety precautions • Clean tools, equipment, and parts • Store tools and equipment codes	manufacturer's specifications	should explain how to check electronic fuel injection system components **Principles:** The student should explain the principles of: • Checking electronic fuel injection system components **Theories:** The student should explain: • Electronic fuel injection system components **Circumstantial knowledge** **Detailed knowledge about:** • Safety precautions while servicing electronic controlled	to be available: • Service Manual • Electronic fuel injection vehicle • Compression tester • Pressure gauge • Tyre stoppers • Exhaust gas analyzer • Injector test bench • Diagnostic tester • Spark plug spanner • Tool kit • Oscilloscope • Multi-meter • Safety gears	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						gasoline injection components • Safe handling of work tools and equipment • Waste disposal		
	3.2 Servicing electronically-controlled diesel injection system	(a) Troubleshooting electronically controlled diesel fuel injection components	**Brainstorming:** Guide the students to explain the concept of troubleshooting electronically-controlled diesel fuel injection **Practical work:** Guide the students on how to perform troubleshooting electronically controlled diesel fuel injection components **Practical activity:** Organise the students in manageable groups to identify components of electronically-controlled diesel fuel injection	**The student should be able to:** • Use the service manual • Select tools and equipment • Diagnose faults in components of electronically-controlled diesel injection • Replace the faulty components • Test the electronically-controlled diesel injection system • Observe safety precautions • Clean tools, equipment, and	Serviced electronically-controlled diesel injection system functions as per manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to identify the components of an electronically-controlled diesel injection system **Principles:** The student should explain the principles of: • Troubleshooting electronically-controlled diesel fuel injection	The following tools, equipment and safety gears are to be available: • Service manual • Engine with electronically-controlled injection system • Common rail diesel injection system • Tool kit • Work bench • Multimetre • Tachometer • Work bench light • Safety gears	82

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
				workplace • Store tools, equipment, and parts		components **Theories:** The student should explain: • The working of electronically-controlled diesel fuel injection and the procedure for troubleshooting **Circumstantial knowledge** **Detailed knowledge about:** • Observe safety precautions while servicing the electronically-controlled diesel fuel injection system • Safe handling of work tools,		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						equipment, and waste disposal		
		(b) Servicinghigh-pressuree pump	**Brainstorming:** Guide the students to explain the concept of servicing high-pressure pump **Practical work:** Guide the students on how to service high-pressure pump **Practical activity:** Organise the students in manageable groups to identify types of high-pressure pumps	**The student should be able to:** • Use the service manual • Select tools and equipment • Service faults components of the electronically-controlled diesel injection high pressure pump • Replace high pressure faulty components • Test the electronically-controlled diesel fuel high-pressure pump • Observe safety precautions • Clean tools, equipment, and workplace • Store tools, equipment, and parts	Serviced electronically-controlled diesel injection high pressure pump functions as per manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to service electronically-controlled diesel fuel high pressure pump high **Principles:** The student should explain the principles of: • Servicing of different electronically-controlled diesel fuel injection high-pressure pumps **Theories:** The student should explain:	This element can be achieved at a school training workshop. The following tools, equipment and safety gears are to be available: • Service manual • Engine with diesel fuel electronically-controlled injection system • Common rail diesel injection system • Tool kit • Work bench • Multimetre • Tachometer • Work bench light • Safety gears	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						• The performance of different electronically-controlled diesel fuel injection high-pressure pumps **Circumstantial knowledge Detailed knowledge about:** • Safety precautions while servicing electronically-controlled diesel injection system • Safe handling of work tools, equipment and parts • Work disposal		
		(c) Maintaining injector nozzle	**Brainstorming:** Guide the students to explain the concept of maintaining a diesel fuel	**The student should be able to:** • Use the service manual • Select tools and	Serviced electronically-controlled diesel injection system functions as per	**Knowledge evidence: Detailed knowledge of: Method used:**	This unit can be achieved at a workplace or training institution. The following	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			injector nozzle **Practical work:** Guide the students on how to maintain the diesel fuel injector nozzle **Practical activity:** Organise the students in manageable groups to demonstrate how to maintain a diesel fuel injector nozzle	equipment • Diagnose faults of the electronically controlled diesel fuel injector nozzle • Maintain the electronically controlled diesel fuel injector nozzle • Test the electronically-controlled diesel fuel injector nozzle • Observe safety precautions • Clean tools, equipment, and workplace • Store tools, equipment, and parts	manufacturer's specifications	The student should explain how to identify defective electronically-controlled diesel fuel injector nozzle **Principles:** The student should explain the principles of: • Operation of different electronically-controlled diesel fuel injector nozzle • Types of electronically-controlled diesel injection system Theories: The student should explain: • The procedure for maintaining electronically-controlled diesel fuel injector	tools, equipment and safety gear are to be available: • Service Manual • Engine with electronically-controlled injection system • Common rail diesel injection system • Tool kit • Workbench • Multimetre • Tachometer • Work bench light • Overall	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						nozzle **Circumstantial knowledge Detailed knowledge about:** • Safety precautions while servicing electronically-controlled diesel injection system • Safe handling of work tools, equipment, and parts • Work disposal		
44.0 Maintaining electrical components	4.1 Servicing a starter motor	(a) Troubleshooting starter motor	**Brainstorming:** Guide the students to define a starter motor and identify the methods for troubleshooting the starter motor **Practical work:** Guide the students on how to handle the starter motor when performing	**The student should be able to:** • Use the service manual • Select tools and equipment • Perform visual troubleshooting • Perform battery voltage and load test • Checks the starter relay and fuse circuit	The serviced starter motor operates according to the manufacturer's specifications	**Knowledge evidence: Detailed knowledge of: Method used:** The student should explain how to do sequences of starter motor troubleshooting **Principles:** The student should	This element can be achieved at a school training workshop. The following tools, equipment and safety gears are to be available: • Service manual • Vehicle • Electrical bench • Vice	80

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			troubleshooting **Practical activity:** Organise the students in manageable groups to demonstrate how to troubleshoot a starter motor	• Perform bypass test • Check the starter motor voltage drop • Check the solenoid signal • Observe safety precautions • Clean work tools and equipment • Store tools, equipment, and parts • Waste work disposal		explain the principles of: • Starter motor voltage drop test • Starter motor bypass test **Theories:** The student should explain: • Starter motor visual checks • Voltage and load test checks for battery • Remedies for starter motor **Circumstantial knowledge** **Detailed knowledge about:** • Safety precautions while troubleshooting a starter motor • Safe handling of work tools,	• Tool kit • Digital and analogue Multimetre • Oscilloscope • Bench light • Power supply • Clamp meter • Hydrometer • High-rate discharge meter • Battery charger • Test lamp • Safety gears	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						equipment and parts • Waste disposal		
		(b) Servicing starter motor components	**Brainstorming:** Guide the students to explain the concept of servicing the starter motor components and identify the components of a starter motor **Practical work:** Guide the students on how to handle servicing of starter motor components **Practical activity:** Organise the students in manageable groups to demonstrate how to service the components of a starter motor	**The student should be able to:** • Use the service manual • Select tools and equipment • Inspect the starter motor • Remove the starter from the vehicle • Dismantle the starter motor • Diagnose the faults in components. • Rectify the faults • Assemble the starter motor • Test the starter motor on the bench • Fix the starter motor to the engine • Observe safety precautions • Clean work tools and equipment • Store tools, equipment, and parts	The serviced starter motor operates according to the manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to service starter motors **Principles:** The student should explain the principles of: • Servicing the starter motor components • Checking the operation of starter motors **Theories:** **Theories:** The student should explain: • Procedure for servicing starter motor		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						• The types of starter motor and service consideration **Circumstantial knowledge** **Detailed knowledge about:** • Safety precautions while servicing starter motors • Safe handling of work tools, equipment and parts • Waste disposal		
	4.2 Servicing alternators	(a) Troubleshooting alternator	**Brainstorming:** Guide the students to explain the concept of alternator troubleshooting and identify different types of alternators **Practical work:** Guide the students on	**The student should be able to:** • Use the service manual • Select tools and equipment • Perform visual inspection for alternator drive belt, tension, and physical damage	Serviced alternator conforms to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the types of alternators' checks to identify faults	The following tools, equipment and safety gears are to be available: • Service manual • Vehicle • Electrical bench • Vice	66

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			how to perform alternator troubleshooting **Practical activity:** Organise the students in manageable groups to demonstrate how to troubleshoot an alternator	• Check the alternator voltage output of the running and fully loaded engine • Check the magnetism of the alternator through the alternator pulley • Remove the alternator from the engine • Observe safety precautions • Clean work tools and equipment • Store tools, equipment, and parts • Waste work disposal		**Principles:** The student should explain the principles of: • Checking alternator faults • Operation of alternators **Theories:** The student should explain: • Alternator Stator Coil Checks for continuity, ground and resistance test • Alternator rotor checks for continuity, ground, slip ring and field coil test **Circumstantial knowledge Detailed knowledge about:** • Safety precautions while servicing	• Tool kit • Digital and analogue multi-meters • Oscilloscope • Bench light • Power supply • Clamp meter • Hydrometer • High-rate discharge meter • Battery charger • Test lamp • Safety boots • Safety gears	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						alternators • Safe handling of work tools, equipment, and parts • Waste disposal		
		(b) Servicing alternator components	**Brainstorming:** Guide the students to explain the concept of servicing alternator components **Practical work:** Guide the students on how to service different types of alternator components. **Practical activity:** Organise the students in manageable groups to demonstrate the procedure of troubleshooting different alternator components	**The student should be able to:** • Use the service manual • Select tools and equipment • Dismantle the alternator • Diagnose all fault alternator components as follows • Check the stator coil for continuity, ground, and resistance • Check the rotor for continuity, ground, field coil, and slip ring condition • Check the voltage regulator for voltage test and load test • Check the rectifier • Check the brushes for wear • Check clutch pulley and bearing	Serviced alternator components conform to technical specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain the types of alternator components' checks to identify faults **Principles:** The student should explain the principles of: • Checking alternator components • Operation of alternators **Theories:** The student should explain: • Alternator Stator Coil checks for	The following tools, equipment and safety gears are to be available: • Service manual • Vehicle • Electrical bench • Vice • Tool kit • Digital and analogue multi-meters • Oscilloscope • Bench light • Power supply • Clamp meter • Hydrometer • High-rate discharge meter • Battery charger • Test lamp	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
				• Rectify /replace the faulty parts • Assemble the alternators • Test the alternators • Observe safety precautions • Clean work tools, equipment, and parts • Store tools, equipment, and parts		continuity, ground and resistance test • Alternator rotor checks for continuity, ground, slip ring and field coil test **Circumstantial knowledge** **Detailed knowledge about:** • Safety precautions while servicing alternators • Safe handling of work tools, equipment, and parts • Waste disposal	• Safety boots • Safety gears	
5.0 Servicing automatic transmission	5.1 Trouble-shooting conventional automatic transmission	(a) Tracing faults in conventional automatic transmission	**Brainstorming:** Guide the students to define the conventional automatic transmission and identify types of automatic transmission **Practical work:** Guide the students on	**The student should be able to:** • Use the service manual • Select tools and equipment • Use the power washer before the inspection • Check automatic	Faults in automatic transmission attended as per manufacturer's guidelines	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Trace	The following tools, equipment and safety gears are to be available: • Service manual • Tool kit • Air	144

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			how to trace faults in conventional automatic transmission **Practical activity:** Organise the students in manageable groups to demonstrate how to trace faults in the automatic transmission	transmission faults • Locate faults in the automatic transmission system • Repair faults in the automatic transmission system. • Test the automatic transmission system • Observe safety precautions • Clean tools, equipment, and workplace • Store tools and equipment		automatic transmission faults • To repair fault automatic transmission • To identify fault in automatic transmission **Principles:** The student should explain the principles of: • Tracing faults in a conventional automatic transmission • Test conventional automatic transmission **Theories:** The student should explain: • Types of diagnosis in automatic transmission • Remedies of automatic	compressor • Rev counter • Automatic transmission unit • Pressure gauge • Multimetre • Work bench • Overall • Safety boots • Safety glass • Safety gears	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						transmission fault **Circumstantial knowledge** **Detailed knowledge about:** • Safety precautions while troubleshooting faults • Waste work disposal		
		(b) Dismantling automatic transmission	**Brainstorming:** Guide the students to explain the concept of dismantling automatic transmission **Practical work:** Guide the students on how to perform automatic transmission dismantling **Practical activity:** Organise the students in manageable groups to	**The student should be able to:** • Use the service manual • Select tools and equipment • Perform road test • Check the fluid level and condition • Remove the transmission from the vehicle • Remove the transmission pan • Remove the valve body • Remove the pump • Disassemble the clutch pack	Overhauled automatic transmission operates according to the manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Dismantle automatic transmission components • Identify automatic transmission	The following tools, equipment and safety gears are to be available: • Vehicle with automatic transmission • Service manual • Tool kit • Wheel blocks • Hydraulic pressure tester • Overall • Safety boots • Gloves	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			perform automatic transmission dismantling	• Inspect and remove the planetary gear set • Remove the brake band and sensors • Take out the input and output shaft • Inspect torque converter • Check the components for damage • Replace the damaged parts • Assemble the gearbox • Perform the stall test • Observe safety precautions • Clean tools and workplace • Store tools, equipment and parts		components • Service automatic transmission components • Assemble automatic transmission components **Principles:** The student should explain the principles of: • Dismantling automatic transmission gearbox **Theories:** The student should explain: • Types of automatic transmissions **Circumstantial knowledge:** **Detailed knowledge about:**		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						• Safety precautions while servicing automatic transmission • Safe handling of work tools, equipment, and parts • Waste disposal		
		(c) Dismantling four-wheel transfer case	**Brainstorming:** Guide the students to explain the concept of a four-wheel transfer case and identify methods of dismantling it **Practical work:** Guide the students on how to dismantle four-wheel transfer case **Practical activity:** Organise the students in manageable groups to demonstrate how to dismantle the four-wheel transfer case	**The student should be able to:** • Use the service manual • Select tools and equipment • Remove case bolt • Inspect and remove seals and bearing • Remove the input shaft • Disassemble the chain drive • Remove the planetary gear set • Disassemble the shaft mechanism • Inspect the internal components • Lean the internal	Overhauled automatic transmission operates according to manufacturer's specifications	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Dismantle automatic transmission transfer case. • Identify automatic transmission transfer case components. **Principles:** The student should	•	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
				parts • Replace the fault components • Assemble the transfer case • Refill transmission fluid • Test the transfer case • Observe safety precautions • Clean tools and work place • Store tools, • equipment, and parts		explain the principles of: • Construction and operation of automatic gearboxes transfer case. **Theories:** The student should explain: • Types of automatic transmissions • Functions of the main components of automatic transmission or transaxle • Five preliminary checks for automatic transmission or transaxle • Effect of engine condition on transmission or transaxle • Adjustments		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						required on automatic transmissions or transaxles **Circumstantial knowledge: Detailed knowledge about:** • Safety precautions while servicing automatic transmission • Safe handling of work-tools, equipment and parts • Waste disposal		
	5.2 Trouble-shooting electrically controlled automatic transmission	(a) Tracing faults in electrically controlled automatic transmission	**Brainstorming:** Guide the students to define electronically controlled automatic transmission **Practical work:** Guide the students on how to trace fault in	**The student should be able to:** • Use the service manual • Select tools and equipment • Use power washer before inspection • Diagnose the electrically controlled transmission	Faults in automatic transmission attended as per manufacturer's guidelines	**Knowledge evidence: Detailed knowledge of: Method used: The student** should explain how to: • Diagnose electrically	This element can be achieved at a school training workshop. The following tools, equipment and safety gears are to be available: • Service manual • Tool kit • Air compressor	98

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			electrically controlled automatic transmission **Practical activity:** Organise the students in manageable groups to demonstrate how to trace faults in electronically controlled automatic transmission	• Locate faults in an electrically controlled automatic transmission system • Repair faults in the automatic transmission system • Test the automatic transmission system • Observe safety precautions • Clean tools, equipment, and work place • Store tools and equipment		controlled automatic transmission unit • Clear identified faults **Principles:** The student should explain the principles of: • Tracing faults in electrically controlled transmission **Theories:** The student should explain: • Possible faults in automatic transmission and their remedies **Circumstantial knowledge** **Detailed knowledge about:** • Safety precautions while troubleshooting	• Rev counter • Electrically controlled automatic transmission unit • Pressure gauge • Multimetre • Work bench • Safety gears	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						faults in electrically controlled automatic transmissions • Safe handling of work tools, equipment and parts • Waste disposal		
		(b) Rectifying fault for electrical controlled transmission (ECT)	**Brainstorming:** Guide the students to explain the concept of rectifying fault for ECT **Practical work:** Guide the students on how to perform electrically controlled automatic transmission **Practical activity:** Organise the students in manageable groups to demonstrate the procedure for rectifying faults in automatic transmission	**The student should be able to:** • Use the service manual • Select tools and equipment • Use power washer before inspection • Locate faults in ECT automatic transmission system • Repair faults in ECT automatic transmission system • Test the automatic transmission system (ECT) • Observe safety precautions	Faults in automatic transmission attended as per manufacturer's guidelines	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Rectify ECT automatic transmission unit • Trace faults in ECT automatic transmission • Clear ECT identified faults **Principles:** The	The following tools, equipment and safety gears are to be available: • Service manual • Tool kit • Air compressor • Rev counter • Automatic transmission unit • Pressure gauge • Multimetre • Work bench • Overall • Safety boots • Safety glass	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						student should explain the principles of: • Tracing faults in electrically controlled transmission • Rectifying faults in ECT automatic transmission **Theories:** The student should explain: • Possible faults in ECT automatic transmission system, causes and their remedies **Circumstantial knowledge** **Detailed knowledge about:** • Safety precautions while troubleshooting faults in		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						automatic transmissions. • Safe handling of work tools, equipment and parts. • Waste disposal		
6.0 Managing safety work environment	6.1 Managing hazards	(a) Controlling mechanical hazards	**Brainstorming:** Guide the students to define mechanical hazards and identify different types of mechanical hazards **Practical work:** Guide the students on how to handle different mechanical hazards **Practical activity:** Organise the students in manageable groups to demonstrate how to manage mechanical hazards	**The student should be able to:** • Interpret service manuals • Select tools and equipment • Use OSHA rules and regulations • Prepare workshop inspection report • Prepare workshop colour code and safety signs • Identify any mechanical safety hazard • Handle mechanical hazards • Prepare preventive maintenance • Identify mechanical hazards and apply all emergency equipment and supplies	Mechanical hazards, risks, incidents, and accidents are managed according to OSHA's rules and regulations	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Control mechanical hazards • Conduct assessment • Carry out accident investigation **Principles:** The student should explain the principles of: • Controlling mechanical hazards	The following tools, equipment and safety gears are to be available: • Electrical equipment • Mechanical equipment • Power machines • Measuring tools • Cutting tools • First aid kit • Fire extinguishers • Service manuals • OSHA rules and regulations • Safety gears	21

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
				• Conduct safety awareness training to sub-ordinates • Monitor safety environment • Manage uses of safety gears • Cleaning tools and equipment • Storing tools and equipment • schedule		• Identifying mechanical hazards **Theories:** The student should explain: - • Mechanical hazards • Importance of posting warning sign and safety instructions		
		(b) Controlling chemical hazards	**Brainstorming:** Guide the students to define firefighting equipment, explain the causes of fire in workshop, and classes of fire **Practical work:** Guide the students on how to handle different equipment and materials when fighting with fire **Practical activity:** Organise the students in manageable groups to	**The student should be able to:** • Interpret service manuals • Select tools and equipment • Use OSHA rules and regulations • Prepare workshop inspection report • Prepare workshop colour code and safety signs • Identify any safety hazard materials • Handle hazards material • Prepare preventive	Chemical hazards, risks, incidents, and accidents are managed according to OSHA's rules and regulations	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Control chemical hazards • Monitor safe working environment **Principles:** The student should explain the	The following tools, equipment and safety gears are to be available: • Diesel fuel tank • Sulphuric acid Powder • Gasoline fuel tank • Explosive liquid • extinguishers • Service manuals • OSHA rules and regulations • Safety gears	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			demonstrate how to use different firefighting equipment and materials in PPF workshop	maintenance schedule • Identify and apply all emergency equipment and supplies • Conduct safety awareness training to sub-ordinates • Monitor safety environment • Manage uses of safety gears • Cleaning tools and equipment • Storing tools and equipment		principles of: • Identifying chemical hazards • Handing chemical hazard **Theories:** The student should explain: • The function of inspection check list • The importance of posting warning sign and safety instructions • The importance of monitor safety at working place **Circumstantial knowledge Detailed knowledge about:** • Safety precautions while manage		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						hazards • Safe handling of tools and equipment • Waste disposal		
		(c) Controlling physical hazards	**Brainstorming:** Guide the students to define physical hazards and identify types of physical hazards **Practical work:** Guide the students on how to handle different physical hazards **Practical activity:** Organise the students in manageable groups to demonstrate how to manage a physical hazard	**The student should be able to:** • Interpret service manuals • Select tools and equipment • Use OSHA rules and regulations • Prepare workshop inspection report • Prepare workshop colour code and safety signs • Identify any safety physical hazard • Handle physical hazards • Prepare preventive maintenance schedule • Identify and apply all emergency equipment and supplies • Conduct safety awareness training to	Physical hazards, risks, incidents, and accidents are managed according to OSHA's rules and regulations	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Identify physical hazards • Use safety gears • Prepare preventive maintenance schedule and inspection report • Monitor safe working environment **Principles:** The student should	The following tools, equipment and safety gears are to be available: • Electrical equipment • Mechanical equipment • Power machines • Measuring tools • Cutting tools • First aid kit • Fire extinguishers • Service manuals • OSHA rules and regulations • Safety gears	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
				sub-ordinates • Monitor safety environment • Manage uses of safety gears • Cleaning tools and equipment • Storing tools and equipment •		explain the principles of: • Preparing warning signs and safety instructions • Handing physical hazards **Theories:** The students should explain: • The importance of posting warning sign and safety instructions • The importance of monitor safety at working place **Circumstantial knowledge** **Detailed knowledge about:** • Safety precautions while manage hazards		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						• Safe handling of tools and equipment • Waste disposal		
	6.2 Carrying out risk assessment	(a) Controlling risk	**Brainstorming:** Guide the students to explain the concept of risk controlling **Practical work:** Guide the students on how to control different risks **Practical activity:** Organise the students in manageable groups to demonstrate the methods of risk controlling	**The student should be able to:** • Interpret service manuals • Select tools and equipment • Carry out risk assessment for all types hazards • Identify types of hazards and apply risk assessment correctly • Calculate the impact of risk • Handle hazard material correctly after risk assessment • Prepare universal workshop colour codes and know what the colour represents • Make out and file safe report • Ensure availability of personal protective equipment	Risk assessment carried out as per OSHA standard and automobile regulations	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The students should explain how to: • Make risk assessment for different types of hazards is conducted **Principles:** The student should explain the principles of: • Performing risks assessment • Identifying best approach for assessing risk **Theories:** The student should explain: -	The following tools, equipment and safety gears are to be available: • Service manuals • OSHA regulations • Workshop rules • Camera • Risk assessment sheet • Mask • Ear plug • Gloves • Overall • Safety boots • Safety clear glasses	21

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
				• Monitor good environmental practices		• The procedure for carrying out risk assessment **Circumstantial knowledge** **Detailed knowledge about:** • Safety precautions while carrying out risk management • Safe handling of tools and equipment • Waste disposal		
		(b) Managing safety gears	**Brainstorming:** Guide the students to define safety gears and identify types of safety gears **Practical work:** Guide the students on how to handle different safety gears **Practical activity:**	**The student should be able to:** • Interpret service manuals • Select tools and equipment • Supervise practice safe workshop practices to protect yourself, other and properties • Make periodic inspections of	Safety gears are available as per OSHA standards and automobile regulations	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Manage safety gears • Identify types of safety gears related to		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			Organise the students in manageable groups to demonstrate how to manage safety gears	workshop area and all equipment and prepare report • Conduct safety training on workshop colour codes and know what the colour represents • Make out and file safe report • Ensure availability of personal protective equipment • Supervise compressed air rules • Monitor safety gears • Clean tools and equipment • Store tools and equipment		his/her professional **Principles:** The student should explain the principles of: • Managing safety gears **Theories:** The student should explain: • The steps for handling of safety gears for different hazards **Circumstantial knowledge Detailed knowledge about:** • Safety precautions while carrying out risk management • Safe handling of tools and equipment		
	6.3 Managing environment	(a) Manage air pollution	**Brainstorming:**	**The student should be able to:**	Workshop environment	**Knowledge evidence:**	This element can be achieved at a school	27

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			Guide the students to define air pollution and identify different types of pollution **Practical work:** Guide the students on how to handle air pollution **Practical activity:** Organise the students in manageable groups to demonstrate the procedure for managing air pollution	• Select relevant safety gears • Prepare a preventive maintenance schedule • Control air pollution • Maintaining safe air • Managing in a safe personal environment • Control tools, equipment, and safety gears • Control different types of waste as per OSHA regulations • Conduct safety awareness training to subordinates • Clean tools and equipment • Store tools and equipment	managed as per rules and regulations	**Detailed knowledge of: Method used:** The student should explain how to: • Air pollution and regulations • Prepare preventive maintenance schedule and inspection report • Monitor a safe working environment • Control different types of wastes **Principles:** The student should explain the principles of: • Managing air pollution • Preparing and conducting training	training workshop. The following tools, equipment and safety gears are to be available: • Tool kit • Sprit level • Safety boots • Gloves • Overalls • Cleaning materials • Hoe • Broom • Brush • Safety gears • Dust covers • Dust mask • Dust bin • Wheel barrow • Engine test room • Air blower • Ventilator	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						• Handling different types of wastes **Theories:** The student should explain: • The importance of safe work environment • The types of environment pollution • The importance of controlling different types of wastes **Circumstantial knowledge** **Detailed knowledge about:** • Safety knowledge while managing environmental pollution • Safe handling of tools and equipment • Waste disposal		
		(b) Managing	**Brainstorming:**	**The student should be**	Workshop	**Knowledge**	The following	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
		water pollution	Guide the students to define water pollution and identify the causes of water pollution **Practical work:** Guide the students on how to handle water pollution **Practical activity:** Organise the students in manageable groups and demonstrate the procedure for managing water pollution	**able to:** • Select relevant safety gears • Prepare a preventive maintenance schedule • Control water pollution • Maintaining safety of water • Managing a safe personal environment • Control tools, equipment and safety gears • Control different types of waste as per OSHA regulations • Conduct safety awareness training for subordinates • Clean tools and equipment • Store tools and equipment	environment managed as per rules and regulations to prevent spill of hazardous material	**evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Manage water pollution • Prepare preventive maintenance schedule and inspection report • Monitor safe water • Control different types of wastes • Manage uses of safety gears **Principles:** The student should explain the principles of: • Managing water pollution • Handling	tools, equipment and safety gears are to be available: • Tool kit • Sprit level • Multimetre • Safety boots • Gloves • Overalls • Cleaning materials • Hoe • Broom • Brush • Safety gears • Dust covers • Dust mask • Dust bin • Wheel barrow	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						environmental safety work • Preparing and conducting training **Theories:** The student should explain: • The importance of safe water at work • The types of water pollution **Circumstantial knowledge** **Detailed knowledge about:** • Safety knowledge while managing environmental pollution • Safe handling of tools and equipment		
		(c) Managing land pollution	**Brainstorming:** Guide the students to explain the concept of managing land pollution	**The student should be able to:** • Select relevant safety gears • Prepare a preventive	The workshop environment managed as per rules and regulations to prevent land	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student	The following tools, equipment and safety gears are to be available: • Tool kit	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			Practical work: Guide the students on how to manage land pollution **Practical activity:** Organise the students in manageable groups to demonstrate the procedure for managing land pollution	maintenance schedule • Control land pollution • Maintaining the safety of land • Control tools, equipment, and safety gears • Control different types of land pollution as per OSHA regulations • Conduct safety awareness training for land pollution • Clean tools and equipment • Store tools and equipment	pollution	should explain how to: • Control land pollution • Prepare preventive maintenance schedule and inspection report • Monitor a safe working environment • Control different types of land pollution **Principles:** The student should explain the principles of: • Managing land pollution • Handling land safety work **Theories:** The student should explain: - • The importance of a safe work environment	• Sprit level • Multimetre • Safety boots • Gloves • Overalls • Cleaning materials • Hoe • Broom • Brush • Safety gears • Dust covers • Dust mask • Dust bin • Wheelbarrow	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						Circumstantial knowledge **Detailed knowledge about:** • Safety knowledge while managing environmental pollution • Safe handling of tools and equipment • Waste disposal		
7.0 Managing preventive maintenance	7.1 Planning preventive maintenance	(a) Preparing preventive maintenance schedules for tools, machines, and equipment	**Brainstorming:** Guide the students to define preventive maintenance schedule **Practical work:** Guide the students on how to prepare preventive maintenance schedule and source of information used to create a preventive maintenance schedule **Practical activity:** Organise the students in manageable groups to	**The student should be able to:** • Interpret service manuals • Read and apply workshop rules and regulations • Select tools and equipment • Make periodic inspection of workshop area and all equipment • Prepare workshop inspection report of	Preventive maintenance is planned as per workshop standards	**Knowledge evidence:** **Detailed knowledge of**: **Method used:** The student should explain how to: • Prepare workshop inspection report • Prepare workshop colour code and	The following tools, equipment and safety gears are to be available: • General hand foot kit • Workshop tools, equipment, and machines • Service manuals • Workshop rules and regulations • Gloves • Overall • Safety boots	18

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			identify different types of preventive maintenance	tools and equipment • Prepare preventive maintenance programmes • Prepare workshop preventive maintenance schedule • Prepare and use workshop colour court and safety signs • Plan and prepare workshop inventory • Clean tools and equipment • Store tools and equipment		safety signed • Plan and prepare workshop inventory • Plan and prepare preventive maintenance training **Principles:** The student should explain the principles of: • Preparing colour code and safety signs • Preparing preventive maintenance schedule • Planning and preparing workshop inventory **Theories:** The student should explain: • The importance of interpreting service manuals	• Safety clear glasses • Helmet • Mask • Ear plug	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						• The importance of preparing workshop inspection and maintenance schedule reports • The importance of preparing maintenance training programmes • The importance of cleaning and storing tools and equipment **Circumstantial knowledge Detailed knowledge about:** • Safety precautions while planning preventive maintenance • Safe handling of tools and equipment		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						• Waste disposal		
		(b) Inspecting tare weight of tools, equipment, and machines checklist	**Brainstorming:** Guide the students to define the inspection checklist **Practical work:** Guide the students on how to prepare the inspection checklist **Practical activity:** Organise the students in manageable groups to demonstrate the procedure for preparing inspection check list	**The student should be able to:** • Interpret service manuals • Read and apply workshop rules and regulations • Select tools and equipment • Make periodic inspection of workshop area and all equipment • Prepare workshop inspection report of tools and equipment • Prepare workshop preventive maintenance schedule		**Knowledge evidence:** **Detailed knowledge of**: **Method used:** The students should explain how to: • Prepare inspection checklist for machinery **Principles:** The students should explain the principles of: • Preparing inspection check list **Theories:** The student should explain: • The importance of checklist	The following tools, equipment and safety gears are to be available: • General hand foot kit • Workshop tools, equipment, and machines • Service manuals • Workshop rules and regulations • Gloves • Overall • Safety boots • Safety clear glasses • Helmet • Mask • Ear plug	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						inspection • The importance of preparing workshop inspection and maintenance schedule **Circumstantial knowledge** **Detailed knowledge about:** • Observe Safety		
	7.2 Supervising preventive maintenance	(a) Performing preventive maintenance of tools, equipment, and machines	**Brainstorming:** Guide the students to explain the concept of performing preventive maintenance for tools, equipment, and machines **Practical work:** Guide the students on how to perform preventive maintenance for tools, equipment, and	**The student should be able to:** • Interpret service manuals • Read and apply rules and regulations • Prepare and apply workshop inspection report • Prepare and use safety signs and colour code • Prepare and apply	Preventive maintenance of tools, equipment, machines, and building are performed as per workshop standards	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The students should explain how to: • Prepare and apply workshop preventive schedule • Plan and	The following tools, equipment and safety gears are to be available: • General hand foot kit • Workshop tools, equipment and machines • Service manuals • Workshop	17

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			machines **Practical activity:** Organise the students in manageable groups to show the procedure for performing preventive maintenance for tools, equipment, and machines	workshop preventive maintenance schedule • Plan and conduct preventive maintenance training • Practice correct hand tools and equipment safety • Practice correct lift and jack safety • Practice good electrical safety • Monitor good and environmental practices • Clean tools and equipment • Store tools and equipment		conduct preventive maintenance for tools, equipment and machines **Principles:** The student should explain the principles of: • Preparing and applying preventive maintenance for tools, equipment and machines **Theories:** The student should explain: • The importance of preparing and applying preventive maintenance for tools, equipment, and machines **Circumstantial knowledge**	rules and regulations • Gloves • Overall • Safety boots • Safety clear glasses • Helmet • Mask • Ear plug	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						Detailed knowledge about: • Safety precautions while planning preventive maintenance • Safe handling of tools and equipment • Waste disposal		
8.0 Managing workshop activities	8.1 Designing workspace layout	(a) Outlining workshop service bay	**Brainstorming:** Guide students to brainstorm on different types of the workshop service bay **ICT-based learning approach:** Guide students through the ICT learning approach to describe different workshop service bay **Practical Work:** Guide students through hands-on activities to explore the concepts and principles of the workshop service bay	**The student should be able to:** • Plan a workshop layout • Locate the workshop sections • Locate the installation of different machines • Identify the places for safety gears equipment • Identify a convenient place for stores • Identify a convenient place to assemble in case of emergency • Mark an emergency exit • Locate information	Designed workshop layout conforms to environmental and Ministry of Labour rules and regulations	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Design different workshop sections • Identify place of safety **Principles:** The student should explain the principles of:	The following tools, equipment and safety gears are to be available: • Organisation structures • Different workshop layouts • Overhead projector • Computer • Chalk board • Workshop with various sections • Different management	33

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
				resource centre • Locate the laundry and latrines • Arrange the tools • Design security system for tools and equipment • Implement a safety system for workers • Identify marks and postures • Place sign marks and postures • Label safety precautions for workshop materials and goods		• Laying out the workshop • Machine installation in workshop **Theories:** The student should explain: • The steps to design workshop layout **Circumstantial knowledge: Detailed knowledge about:** • Safety precautions while planning preventive maintenance • Safe handling of tools and equipment • Waste disposal	textbooks • Handouts • Drawing instruments	
		(b) Designing layout of light-duty equipment	**Brainstorming:** Guide the students to define the layout of light-	**The student should be able to:** • Plan a workshop layout for light-duty	Designed workshop layout conforms to environmental	**Knowledge evidence: Detailed knowledge of:**	The following tools, equipment and safety gears are to be available:	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			duty equipment **Practical work:** Guide the students on how to design the layout of light-duty equipment **Practical activity:** Organise the students in manageable groups to perform the designing of the layout light-duty equipment	equipment • Locate the workshop sections • Locate the installation of different machines • Identify places for safety gears equipment • Identify a convenient place for stores • Identify a convenient place to assemble in case of emergency • Mark an emergency exit • Locate information resource centre • Locate the laundry and latrines • Arrange the tools • Design a security system of tools and equipment • Implement a safety system for workers • Identify the marks and postures • Place the sign mark and postures • Label the safety precautions for	and Ministry of Labour rules and regulations	**Method used:** The student should explain how to: • Arrange different workshop sections. • Apply safety precautions **Principles:** The student should explain the principles of: • Laying out workshop • Installing machine in the workshop **Theories:** The student should explain: • The steps to design workshop layout • The components applied in workshop	• Organisation structures • Different workshop layouts • Overhead projector • Computer • Chalk board • Workshop with various sections • Different management text books • Handouts • Drawing instruments	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
				workshop materials and goods		safety and security systems **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while planning preventive maintenance • Safe handling of tools and equipment • Waste disposal		
		(c) Designing the layout of heavy-duty equipment	**Brainstorming:** Guide the students to define the layout of heavy-duty equipment **Practical work:** Guide the students on how to design the layout of heavy-duty equipment	**The student should be able to:** • Plan a workshop layout for heavy-duty equipment • Locate the workshop sections for heavy-duty equipment • Locate the installation of different machines • Identify places for	Designed workshop layout conforms to environmental and Ministry of Labour rules and regulations	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Design different workshop sections for heavy duty	The following tools, equipment and safety gears are to be available: • Organization structures • Different workshop layouts • Overhead projector	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			Practical activity: Organise the students in manageable groups to perform the designing of heavy-duty equipment layout	safety gears equipment • Identify a convenient place for stores • Identify a convenient place to assemble in case of emergency • Mark an emergency exit • Locate information resource centre • Locate the laundry and latrines • Arrange the tools • Design a security system of tools and equipment • Implement a safety system for workers • Identify the marks and postures • Place the sign mark and postures • Label the safety precautions for workshop materials and goods		equipment **Principles:** The student should explain the principles of: • Laying out workshop for heavy duty equipment • Installing a machine for heavy duty equipment workshop **Theories:** The student should explain: • The steps for designing a workshop layout **Circumstantial knowledge: Detailed knowledge about:** • Safety precautions while planning preventive maintenance • Safe handling of	• Computer • Chalk board • Workshop with various sections • Different management text books • Handouts • Drawing instruments	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						tools and equipment • Waste disposal		
	8.2 Controlling tools and equipment	(a) Maintaining tools' control system	**Brainstorming:** Guide the students to explain the concept of maintaining the tools' control system **Practical work:** Guide the students on how to maintain the tools control system. **Practical activity:** Organise the students in manageable groups to maintain the tools control system	**The student should be able to:** • Design tools storage system • Keep a record of tools and equipment in the workshop • Record tools and equipment issued and received daily • Record damaged tools and equipment • Record lost equipment and tools • Discard damaged tools and equipment • Produce a report on tools and equipment • Order new tools and equipment	Tools and equipment controlled as per stores and financial regulations	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** **The student** should explain how to: • Maintain ledgers of tools and equipment • Conduct stock-taking • Maintain inventory records of tools and equipment **Principles:** The student should explain the principles of controlling tools and equipment in workshops **Theories:** The student should explain: • The properties	The following tools, equipment and safety gears are to be available: • Skills logbook • Tools and equipment catalogue • Scientific calculator • Staple machine • Binding machine • Tools list • Wall cupboards • Bench with tool crimp • Tool kit • Tools issue voucher • Tools ledger • Files • Equipment ledger • Tools inventory list • Overcoat	33

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						of tools and equipment • Effects of weather on different tools • Required security in stores/workshops **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while controlling tools and equipment • Safe handling of tools and equipment • Waste disposal	• Safety gears	
		(b) Taking inventory of tools and equipment	**Brainstorming:** Guide the students to explain the concept of taking inventory of tools and equipment **Practical work:**	**The student should be able to:** • Take inventory of tools and equipment • Keep a record of tools and equipment in the workshop • Record tools and	Tools and equipment controlled as per stores and financial regulations	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to:		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			Guide the students on how to take inventory of tools and equipment **Practical activity:** Organise the students in manageable groups to perform an inventory of tools and equipment	equipment issued and received daily • Record damaged tools and equipment • Record lost equipment and tools • Discard damaged tools and equipment • Order new tools and equipment • Produce a report of tools and equipment		• Maintain inventory of tools and equipment • Conduct stock-taking **Principles:** The student should explain the principles of controlling tools and equipment in workshops **Theories:** The student should explain: • The properties of tools and equipment • Effects of weather on different tools **Circumstantial knowledge: Detailed knowledge about:** • Safety precautions while controlling tools and equipment		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						• Safe handling of tools and equipment • Waste disposal		
	8.3 Estimating Material and labour cost	(a) Maintaining records of workshop materials	**Brainstorming:** Guide the students to explain the concept of maintaining records of workshop material **Practical work:** Guide the students on how to maintain the workshop materials **Practical activity:** Organise the students in manageable groups to perform recording of workshop materials	**The student should be able to:** • Maintain records of workshop materials • Read inspection material records • Prepare material cost estimates • Prepare material requisition list • Distribute quotations to shops • Store tools, equipment, and materials	Records of materials are maintained as per task requirements	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Maintain material records • Calculate costs of materials **Principles:** The student should explain the principles of determining material records. **Theories:** The student should explain: • The importance of recording materials **Circumstantial knowledge:**	The following tools, equipment and safety gears are to be available: • List of spares and material • Prepared materials • Local purchases order (LPO) • Calculator/Computer • Binding machine • Material requisition form (Material requisition voucher form (MVR) • Job card • Price list • Mask • Goods receive note (GRN) • Gloves • Overcoat	33

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						Detailed knowledge about: • Safe handling of materials and documents • Waste disposal	• Safety boot	
		(b) Maintaining man hours/day workshop staff	**Brainstorming:** Guide the students to explain the concept of man hours/day workshop staff **Practical work:** Guide the students on how to maintain man hours' workshop **Practical activity:** Organise the students in manageable groups to maintain workshop man hours	**The student should be able to:** • Maintain workshop man hours • Read man hours • Prepare overhead costs • Prepare job cost • Calculate man hours daily	Cost estimates of materials and labour prepared as per task requirements	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Calculate labour cost. **Principles:** The student should explain the principles of determining man-hour rate to make labour cost estimates **Theories:** The student should explain: • The importance of estimating materials and	The following tools, equipment and safety gears are to be available: • List of maintenance crew member • Calculator/Computer • Daily records of excess work • Overtime records • Goods receive note (GRN)	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						labour cost **Circumstantial knowledge:** **Detailed knowledge about:** • Safe handling of materials and documents • Waste disposal		
		(c) Performing job cost calculations	**Brainstorming:** Guide the students to explain the concept of calculating job costing **Practical work:** Guide the students on how to calculate job costing **Practical activity:** Organise the students in manageable groups to perform calculation of job costing	**The student should be able to:** • Preform job calculation • Prepare job cost estimates • Prepare overhead costs • Prepare material cost • Obtain proforma invoice for estimating job cost	Cost estimates of materials and labour prepared as per task requirements	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Calculate costs of materials and labour **Principles:** The student should explain the principles of determining man hour rate to make labour cost estimates **Theories:** The student should	The following tools, equipment and safety gears are to be available: • List of spares and material • Prepared materials • Local purchases order (LPO) • Calculator/Computer • Job card • Price list • Man hours	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						explain: • The importance of estimating materials and labour cost **Circumstantial knowledge:** **Detailed knowledge about:** • Safe handling of materials and documents • Waste disposal		
	8.4 Performing on job training to subordinates	(a) Preparing training needs	**Brainstorming:** Guide the students to explain the concept of training needs preparation for subordinate's **Practical work:** Guide the students on how to prepare training needs **Practical activity:** Organise the students in manageable groups to	**The student should be able to:** • Prepare capability chart of the subordinates • Conduct needs assessment • Identify knowledge and skills to be imparted • Identify previous knowledge and skills possessed by the person to be trained • Prepare a training	• A training programme prepared to meet job requirements • A person trained is able to execute tasks to required standards according to regulations	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to prepare a training programme **Principles:** The student should explain the principles of: • Carrying out training	The following tools, equipment and safety gears are to be available: • Workshop • Tool box • Multimetre • Workshop machines • Training materials • Wheel balancing machine • Wheel	33

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			perform preparation of training needs	programme for the subordinate • Carry out the training programme by using a steps plan (prepare, present, try out, assign work). • Continue assessing the progress of workers • Make necessary adjustments to the training programme schedule • Evaluate the adjustment made		programme by using the four steps plan (prepare, present, try-out assign work) • Basic principles of educational psychology **Theories:** The student should explain: The necessity of identifying previous knowledge and skill of the person to be trained **Circumstantial knowledge: Detailed knowledge about:** • Safety precautions while training subordinates • Safe handling of tools, training material and equipment	alignment machine/gauge • Head light aiming machine • Test benches • Bench vices • Anvil • Hydraulic press • Surface block • First aid kit • Firefighting equipment • Emergency exit • Overhead projector • Computer • TV • Organisation structure • Overcoat • Safety boots • Gloves • Safety clear glasses	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						• Waste disposal		
		(b) Carrying out training of subordinates	**Brainstorming:** Guide the students to explain the concept of training subordinates **Practical work:** Guide the students on how to carry out training for subordinates **Practical activity:** Organise the students in manageable groups to carry out training for subordinates	**The student should be able to:** • Prepare capability chart of the subordinates • Conduct training needs assessment • Identify knowledge and skills to be imparted • Identify previous knowledge and skills possessed by the person to be trained • Prepare a training programme for the subordinate	• A training programme prepared to meet job requirements • A person trained can execute tasks to required standards according to regulations	**Knowledge evidence: Detailed knowledge of: The method used:** The student should explain how to prepare a training programme **Principles:** The student should explain the principles of: • Carrying out training programme by using the four steps plan (prepare, present, try-out assign work) **Theories:** The student should explain: • The necessity of identifying previous knowledge and skills of the person to be	This unit can be achieved at work place or training institution. The following tools, equipment and safety gears are to be available: • Workshop • Tool box • Tools • Multimetre • Workshop machines • Surface block • First aid kit • Firefighting equipment • Emergency exit • Overhead projector • Computer • TV • Organisation structure • Overcoat • Safety gears	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						trained • The importance of step-by-step guidance from simple to complex tasks **Circumstantial knowledge:** **Detailed knowledge about:** • Safety precautions while training subordinates • Safe training material • Waste disposal		
	8.5 Preparing reports	(a) Collecting information	**Brainstorming:** **Group discussion:** Guide students through manageable groups to discuss the principles of collecting information used in day-to-day activities **Demonstration:** Guide students to demonstrate	**The student should be able to:** • Collect information • Write technical reports • Prepare an action plan • Prepare a budget report • Keep records	Prepared reports contain required contents as per management requirements	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Prepare technical reports	This element can be achieved at a school training workshop. The following tools, equipment and safety gears are to be available: • Office/table and chairs • Computer • Subordinate's	33

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			the use of specific tools for collecting information **Practical Work:** Guide students through hands-on activities to explore the concepts and principles of collecting information **Practical activity:** Organise the students in manageable groups to demonstrate how to collect information			• Keep records **Principles:** The student should explain the principles of: • Collecting information • Report writing **Theories:** The student should explain: • Importance of reports • Contents of reports • Writing of technical report **Circumstantial knowledge: Detailed knowledge about:** • Safe handling of tools and training materials • Waste disposal	reports • Binding machine • Photocopy machine • Overcoat • Safety boots	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
		(b) Submitting technical reports	**Think-ink-pair-share:** Guide students through think-ink-pair-share to explain the concepts and principles of submitting a technical report **Practical work:** Guide the students on how to submit a technical report **Practical activity:** Organise the students in manageable groups to perform technical report submission	**The student should be able to:** • Collect information • Write technical reports • Prepare an action plan • Prepare a budget report • Keep records • Submit a technical report	Prepared reports contain required contents as per management requirements	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Prepare technical reports • Keep records • Submit technical report **Principles:** The student should explain the principles of: • Submitting technical report **Theories:** The student should explain: • The importance of reports • Contents of reports • Submitting technical report **Circumstantial knowledge:**	This unit can be achieved at a work place or training institution. The following tools, equipment and safety gears are to be available: • Office/table and chairs • Computer • Subordinates' reports • Binding machine • Photocopy machine • Overcoat • Safety boots	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						Detailed knowledge about: • Safe handling of tools and equipment Waste disposal		
	8.6 Managing workshop business	(a) Performing entrepreneurial tactics	**Brainstorming:** Guide students to brainstorm on the concepts of entrepreneur tactics **ICT-based learning approach:** Guide students through the ICT learning approach to explain the concept of entrepreneur motor vehicle mechanics **Field visit:** Organise field visits and guide students to explore the applications of entrepreneurship in motor vehicle mechanics	**The student should be able to:** • Calculate total project cost • Prepare project write-up • Select the appropriate site for establishing a workshop • Acquire land/building for setting up workshop • Purchase tools and equipment • Perform manpower planning • Prepare initial salaries for potential workers • Exercise good customer care • Supervise the provision of payment invoices and receipts	Managed workshop business conforms to stipulated regulations	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Establish workshop business • Run workshop business • Analyse profit and loss **Principles:** The student should explain the principles of: • Acquiring capital from financial institutions	This unit can be achieved at a work place or training institution. The following tools, equipment and safety gears are to be available: • Workshop layout chart • Business films/video cassettes • Business magazines • Workshop business regulations • Study visit • Scheduled maintenance of machines • Job card sheets	31

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
				• Identify labour and overhead costs • Analyse profit and loss • Revisit business plan		• Calculating business profit and loss • Managing private business workshop • Managing non-private business workshop **Theories:** The student should explain: • The meaning of "business" • The meaning of the workshop • Project write-up procedures • Good customer care **Circumstantial knowledge: Detailed knowledge about** • Safe handling of business capital	• Safety gears • Workshop tools and equipment • Personal computer • Workshop stores • Workshop office • Tool ledger book	
		(b) Conducting manpower planning.	**Brainstorming:** Guide students to brainstorm on the concepts and	**The student should be able to:** • Calculate total	Managed workshop business	**Knowledge evidence: Detailed**	The following tools, equipment and safety gears are	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			principles of manpower planning **Think-ink-pair-share:** Guide students through think-ink-pair-share to explore the concepts and principles of manpower planning	project cost • Prepare project up write-up • Select the appropriate site for establishing a workshop • Acquire land/building for setting up workshop • Purchase tools and equipment • Perform manpower planning • Prepare initial salaries for potential workers • Exercise good customer care	conforms to stipulated regulations	**knowledge of:** **Method used:** The student should explain how to: • Establish workshop business • Perform manpower planning • Analyse profit and loss **Principles:** The student should explain the principles of: • Manpower planning • Calculating business profit and loss **Theories:** The student should explain: • The meaning of manpower planning	to be available: • Workshop layout chart • Business films/video cassettes • Business magazines • Workshop business regulations • Scheduled maintenance of machines • Job card sheets • Safety gears • Workshop tools and equipment • Personal computer • Workshop stores • Workshop office • Tool ledger book	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						• The meaning of the workshop **Circumstantial knowledge:** **Detailed knowledge about** • Safe handling of business capital		
		(c) Supervising junior workers	**Group discussion:** Guide students through manageable groups to elaborate on different methods of junior worker supervision **Interactive simulation:** Guide students through interactive simulation to visualize and model supervision for junior worker	**The student should be able to:** • Supervise junior workers • Purchase tools and equipment • Perform manpower planning • Prepare initial salaries for potential workers • Exercise good customer care • Supervise the provision of payment invoices and receipts • Identify labour and overhead costs • Analyse profit and loss • Revisit business plan	Managed workshop business conforms to stipulated regulations	**Knowledge evidence:** **Detailed knowledge of:** **Method used:** The student should explain how to: • Establish a workshop business. • Run workshop business. • Analyse profit and loss **Principles:** The student should explain the principles of: • Acquiring	The following tools, equipment and safety gears are to be available: • Workshop layout chart. • Video, TV, and Computer • Business films/video cassettes • Business magazines • Workshop business regulations • Scheduled maintenance of machines • Job card sheets	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						capital from financial institutions • Calculating business profit and loss • Managing private business workshop • Managing non-private business workshop **Theories:** The student should explain: • The meaning of "business". • The meaning of the workshop • Project write-up procedures • Good customer care **Circumstantial knowledge:**	• Safety gears • Workshop tools and equipment • Personal computer • Workshop stores • Workshop office • Tool ledger book	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
						• **Detailed knowledge about the** Safe handling of business capital.		

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