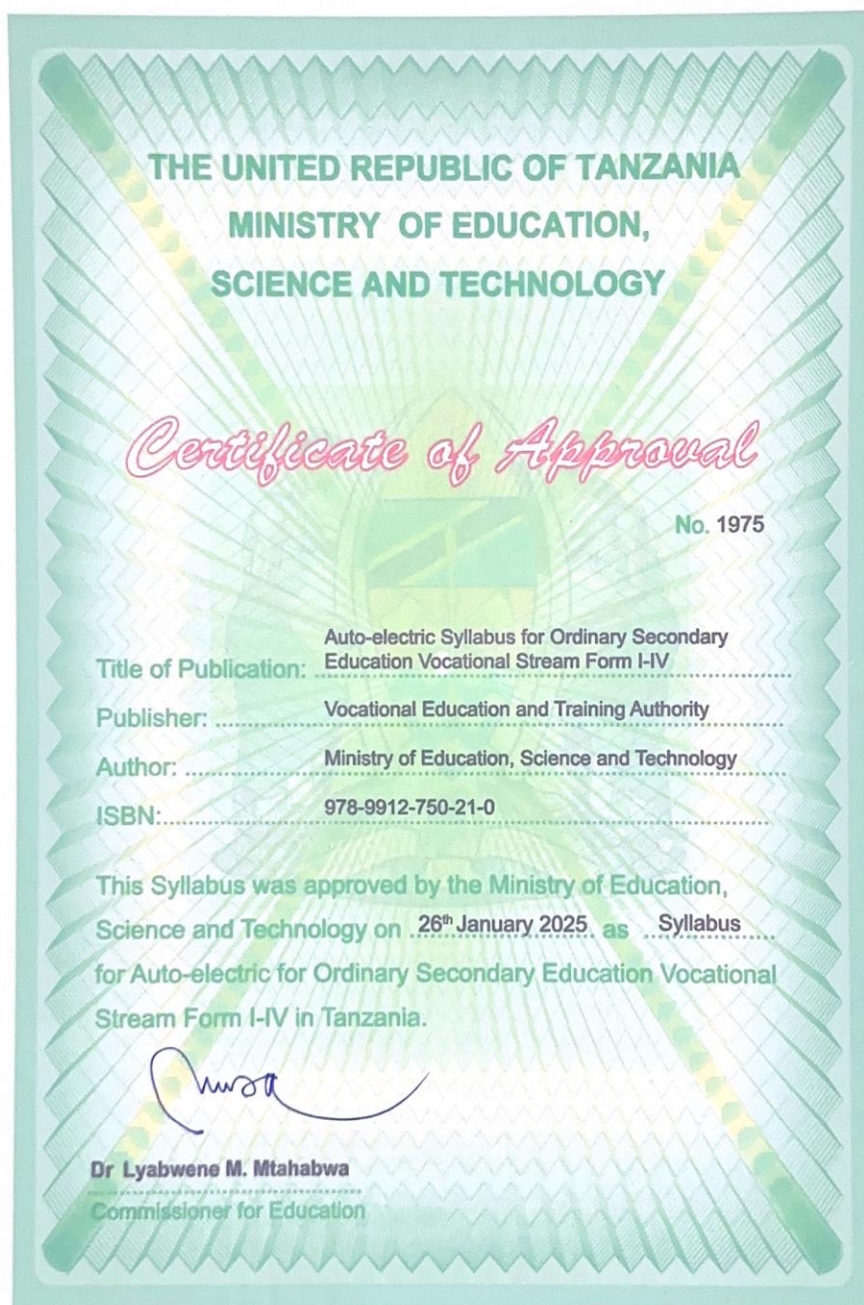


THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY



AUTO-ELECTRIC SYLLABUS FOR ORDINARY SECONDARY EDUCATION
VOCATIONAL STREAM FORM I-IV

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Abbreviations and Acronyms

ABS	Anti-Lock Brake System
AC	Alternating Current
AE	Auto Electric
ATF	Automatic Transmission Fund
DC	Direct Current
EATC	Electronic Automatic Temperature Control
ECU	Electronic Control Unit
EFI	Electronic Fuel Injection
EGR	Exhaust Gas Recirculation
FET	Field Effect Transistors
FTNA	Form Two National Assessment
ICs	Integrated Circuits
ICT	Information and Communication Technology
LED	Light Emitting Diode
LPO	Local Purchase Order
MRV	Material Requisition Voucher
NGO	Non-Governmental Organization
SAE	Society of Automotive Engineers
TIE	Tanzania Institute of Education
OBD	On Board Diagnosis
OHS	Occupational
OSHA	Occupational Safety Health Agency
VETA	Vocational Education and Training Authority

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 the attainment of competency.

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 the attainment of competency.

Circumstantial knowledge: Detailed knowledge, which allows the decision-making in regard to different circumstances and cross-cutting issues.

Competence: The ability to use knowledge, understanding, practical and thinking skills to perform effectively to the workplace standards required in employment.

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

Performance criteria: indicate the expected end 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.

Knowledge Assessment: This is essential knowledge needed to demonstrate competences that are associated with performing a given task.

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. Antony M. Kasore

Director General

1.0. Introduction

Auto-electric is one of the occupations taught in the Ordinary Secondary Education Vocational Stream. Learning Auto-electric is essential because the number of vehicles in Tanzania is significantly increasing. These vehicles can be conventional vehicles, hybrid vehicles, or even electric vehicles containing different electric and electronic systems that need services and maintenance. By teaching Auto-electric, students will develop knowledge and practical skills to service, maintain, and troubleshoot vehicle electrical and electronic systems. It includes diagnosing and rectifying faults, installing and serving electronic control systems, and ensuring the proper wiring and functioning of components like alternators, starters, batteries, lighting systems, and vehicle sensors. This will foster economic development, create jobs, promote environmental sustainability, and preserve cultural heritage.

Upon completion of the program, students will possess both theoretical and practical knowledge of Auto-electric, from basic components identification to advanced system troubleshooting. They will be capable of using tools and equipment to troubleshoot vehicles' electrical and electronics 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 an Auto-electric enterprise, ensuring high standards of quality and services in all aspects of the Auto-electric.

A graduate of this occupation may be employed in both Government and private sectors such as ministries/departments, training institutions, research institutions automotive workshops dealing with vehicles, constructional machineries, agricultural machineries, power plants and, self-employment.

The Auto-electric Syllabus is designed to guide the teaching and learning of Auto-electric 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 Auto-electric. It contains valuable information that will enable teachers to effectively plan 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 1–IV, Vocational Education stream are 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 ability to:

- (a) Demonstrate the principles of workshop management to maintain occupational health, safety rules and regulation.

- (b) Demonstrate the basic principles of maintaining, using and storing tools and equipment to troubleshoot and service auto-electric system.
- (c) Apply the knowledge and technical skills developed to interpret, diagnose and rectify different components of auto-electric circuits and systems.
- (d) Apply the knowledge and technical skills developed to service auto electric systems.

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. Maintaining 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. Performing bench works	2.1 Performing cutting 2.2 Performing filling 2.3 Performing drilling 2.4 Performing reverting 2.5 Performing threading 2.6 Performing metal forming
3. Performing welding processes	3.1 Performing arc welding 3.2 Performing gas welding
4. Building simple electric circuits	3.3 Performing soldering 4.1 Constructing simple electric circuits 4.2 Measuring electric quantities
5. Maintaining wheels and tyres	5.1 Replacing tyres 5.2 Repairing tube and tubeless tyres 5.3 Performing wheel balancing 5.4 Servicing wheel hubs
6. Building simple electronic circuits	6.1 Determining characteristics of active electronic components 6.2 Determining the characteristics of passive electronic components 6.3 Constructing simple electronic circuits
7. Carrying out general maintenance on electrical and electronic systems	7.1 Maintaining batteries 7.2 Servicing electrical and electronic circuits
8. Maintaining starting systems	8.1 Servicing starting systems 8.2 Maintaining starter motors
9. Carrying out general vehicle services	9.1 Servicing engine lubrication systems 9.2 Servicing fuel systems 9.3 Servicing cooling systems 9.4 Servicing transmission systems 9.5 Performing greasing
10. Maintaining the lighting system	10.1 Repairing headlight systems
	10.2 Repairing turn signals and hazard lights
	10.3 Servicing parking lights
	10.4 Servicing brake light systems

Modules (Main Competence)	Units (Specific competences)
11. Repairing hydraulic brake system	11.1 Servicing hydraulic brake system components
	11.2 Servicing drum brake
	11.3 Servicing disc brakes
12. Maintaining suspension system	12.1 Replacing suspension bushes 12.2 Replacing suspension shock absorbers 12.3 Replacing steel suspension springs
13. Carrying out engine maintenance	13.1 Performing engine non destruction tests 13.2 Adjusting valve clearance 13.3 Carrying out ignition timing
14. Maintaining charging system	14.4 Servicing charging systems 14.5 Servicing alternators
15. Maintaining accessories, circuits and components	15.1 Servicing radio systems 15.2 Servicing audio-visual (TV) systems 15.3 Servicing defogger's systems 15.4 Servicing air bag system 15.5 Servicing electric horn systems
16. Maintaining ignition systems	16.1 Servicing conventional ignition systems 16.2 Servicing computerized ignition systems 16.3 Servicing electronic ignition systems
17. Maintaining electric fuel systems	17.1 Servicing petrol fuel electric system 17.2 Servicing diesel electric fuel systems
18. Maintaining an emission control system	18.1 Servicing catalytic converter 18.2 Servicing oxygen sensor 18.3 Servicing muffler and pipes 18.4 Servicing exhaust gas recirculation valve (EGR)
19. Maintaining display panel instruments	19.1 Servicing panel gauges 19.2 Servicing panel light systems 19.3 Servicing electronic speed meters 19.4 Servicing tachometer systems
20. Servicing electrical accessories	20.1 Servicing central door lock systems 20.2 Servicing power seat systems 20.3 Servicing power window systems 20.4 Servicing power mirror systems 20.5 Servicing safety belt monitoring systems
21. Maintaining electronic components	21.1 Servicing sensors 21.2 Servicing electronic control unit (ECU)
22. Maintaining safe work environment	22.1 Managing hazards 22.2 Carrying out risk assessment 22.3 Managing environment
23. Managing preventive maintenance	23.1 Planning preventive maintenance 23.2 Supervising preventive maintenance
24. Carrying out engine management	24.1 Tuning up petrol fuel engines 24.2 Tuning up diesel fuel engines
25. Maintaining automotive air condition system	25.1 Servicing automotive manual-controlled air conditioning systems 25.2 Servicing automatic air conditioning systems 25.3 Maintaining on board refrigerators

Modules (Main Competence)	Units (Specific competences)
26. Servicing chassis electronics and accessories systems	26.1 Servicing Anti- lock Brake System (ABS) 26.2 Servicing vehicle security systems 26.3 Servicing electronic suspension systems 26.4 Servicing electronic shift transmissions 26.5 Servicing tire pressure monitoring systems
27. Managing workshop activities	27.1 Designing workshop layout 27.2 Controlling tools and equipment movement 27.3 Estimating material and labor cost 27.4 Training subordinates 27.5 Preparing reports 27.6 Managing workshop business

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

Good relationships between a teacher, student and parent, or guardian is fundamental to ensuring successful learning. This section outlines the roles of each participant in facilitating effective teaching and learning of Auto-electric.

6.1 The teacher

The teacher is expected to:

- (a) Help the student to learn and develop the intended competences in Auto-electric
- (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 centered instructional strategies that make the student a center of learning which allow 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 for learning;
- (d) Keep track of a child's progress in behaviors;
- (e) Provide the child with any necessary materials required in the learning process; and
- (f) Instill 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 include but are not limited to demonstration, Interactive simulation, brainstorming, think-ink-pair-share, group discussion, practical work, experimentation, field visits, scenarios, targeted questions, hands-on activity, ICT based learning and microteaching. 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 for 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 TIE.

9.0. Assessment

Assessment is important in teaching and learning of Auto-electric occupation. 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 not limited to demonstration, discussions, presentations, oral questions, experiments, observations, practical assignments and projects.

Summative assessment, on the other hand, will focus 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% and 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. Projects 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	

Assessment Category	Weight (%)	National Examination
Form Three Practical	10.0	
Form Four Practical	10.0	
Total	60	

10.0. Number of Periods

The Auto-electric 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 organized into a matrix with seven (07) columns which are main competences, specific competences, learning activities, suggested teaching and learning methods, assessment criteria which is 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 safety of the workshop and surroundings	1.1 Maintaining workshop safety	(a) Maintaining workshop safety rules	Brainstorm: Guide students to brainstorm on the concepts and principles related to maintaining workshop safety rules Group discussion: Facilitate open discussions and share with students on their daily life safety measures experiences Hands-on activities: Guide students in manageable groups through hands-on activities to maintaining workshop safety rules	The student should be able to: • Select tools, equipment and safety gears • Interpret different safety signs in a workshop • Draw safety signs • Maintain workshop safety rules • Clean tools, equipment and workplace • Store tools, equipment and safety gear	Workshop safety rules are maintained as per OSHA standards and regulations	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: • Maintain workshop safety rules Principles: The student should explain principles involved in maintaining workshop safety rules Theories: The student should explain: - • Different types of waste disposal rules • Classification of wastes and their hazards • Importance of safety sign • Importance of maintaining workshop safety rules Circumstantial knowledge Detailed knowledge about:	The following tools, equipment and safety gears are to be available: • Dust bins • Gloves • Overalls • Cleaning materials • Hoe • Broom • Brush • Gumboots • Dust covers • Dust mask	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		
						• OSHA rules and regulations • Workshop rules and regulations		
		(b) Maintaining workshop working environment	Brainstorm: Guide students to brainstorm on the concepts of the workshop working environment Practical work: Guide students on how to maintain a workshop working environment Hands-on activities: Guide students in manageable groups through hands-on activities to identify unmaintained working environment around school workshop	The student should be able to: • Select tools, equipment and safety gears • Maintain workshop working environment • Clean tools, equipment and workplace • Store tools and equipment	Workshop working environment maintained as per safety rules and regulations	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: Maintain safety of workshop and its surrounding Principles: The student should explain the principles involved in maintaining workshop working environment Theories: The student should explain: - • Key aspect of maintaining workshop working environment • Importance of maintaining workshop working environment Circumstantial knowledge Detailed knowledge about: • Safety rules and regulations	The following tools, equipment and safety gears are to be available: • Dust bins • Gloves • Overalls • Cleaning materials • Hoe • Broom • Brush • Gumboots • Dust covers • Dust 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		
						Workshop rules and regulations		
		(c) Maintaining personal safety	Group discussion: Facilitate for discussions to share experiences their daily life safety measures Hands-on activities: Guide students in manageable groups through hands-on activities to maintain personal safety	The student should be able to: - Select relevant safety gears - Take precautions against health and safety hazards - Apply safety gears - Interpret different safety signs in a workshop - Dispose different types of wastes as per OHS - Clean tools, equipment and workplace - Store tools, equipment and safety gear	Personal safety maintained as per safety rules and regulations	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: Maintaining personal safety Principles: The student should explain principles involved in maintaining personal safety Theories: The student should explain: - - Possible workshop accidents and their causes - Prevention of workshop accidents - Different types of wastes disposal - Importance of maintaining personal safety Circumstantial knowledge Detailed knowledge about: - OSHA rules and regulations - Workshop rules and regulations	The following tools, equipment and safety gears are to be available: - Dust bins - Gloves - Overalls - Cleaning materials - Hoe - Broom - Brush - Gumboots - Dust covers - Dust 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		
	1.2 Handling accidents and incidents	(a) Handling mechanical hazards	Case Studies: Guide students to use case study on workshop accidents or safety violations to identify causes and preventive measures of mechanical hazards Activity: Organize the students in manageable groups to identify mechanical hazards on school premises	The student should be able to: • Select relevant safety gears • Handle mechanical hazards • Identify causes of health and safety hazards in a workshop and its surroundings • Take precautions against health and safety hazards • Handle mechanical hazards • Clean tools, equipment and workplace • Store tools, equipment and safety gear	Mechanical hazards accidents and incidents are handled as per OSHA rules and regulations	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: • Identify mechanical hazard materials • Handle mechanical hazards materials and equipment • Use safety gears • Use color code and safety signs Principles: The student should explain principles of: • Handling mechanical hazardous materials Theories: The student should explain: - • Causes of mechanical hazards • Advantages of maintaining mechanical hazards in the workshop Circumstantial knowledge Detailed knowledge about: • OSHA rules and regulations	The following tools, equipment and safety gears are to be available: • Air compressor • Fire extinguisher • Power Machines • Overalls • Gloves • Safety boots • Safety clear glasses • First aid kit • First aid poster • Helmet • Mask	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		
						Workshop rules and regulations		
		(b) Handling physical hazards	Case Studies: Guide students to use case study of workshop accidents or safety violations to identify causes and preventive measures of physical hazards Practical work: Guide students on how to handle mechanical hazards Activity: Organize the students in manageable group to identify mechanical hazards in school premises	The student should be able to: - Select relevant safety gears - Identify causes of physical hazards in a workshop and its surroundings - Interpret different safety signs in a workshop related to physical hazards - Draw safety signs related to physical hazards - Maintain safe working environment - Clean workshop, tools, equipment and workshop surroundings	Physical hazards accidents and incidents handled as per OSHA rules and regulations	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: - Handle physical hazards materials and equipment Principles: The student should explain principles of: - Handling physical hazardous materials Theories: The student should explain: - - Causes of physical hazards - Advantages of maintaining physical hazard in the workshop Circumstantial knowledge Detailed knowledge about: - OSHA rules and regulations - Workshop rules and regulations	The following tools, equipment and safety gears are to be available: - Air compressor - Fire extinguisher - Power Machines - Overalls - Gloves - Safety boots - Safety clear glasses - First aid kit - First aid poster - Helmet - 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		
		(c) Handling chemical hazards	Case Studies: Guide students to use case study of workshop accidents or safety violations to identify causes and preventive measures of chemical hazards Practical work: Guide students on how to handle mechanical hazards Activity: Organize the students in manageable group to identify mechanical hazards in school premises	The student should be able to: - Select relevant safety gears - Maintain workshop safety - Identify causes of health and safety chemical hazards in a workshop and its surroundings - Interpret different safety signs in a workshop related with chemical hazards - Draw safety signs related with chemical hazards - Use safety gears - Maintain personal safety - Dispose different types of chemical	Chemical hazards accidents and incidents handled as per OSHA rules and regulations	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: - Handle chemical hazards Principles: The student should explain principles of: - Handling chemical hazardous materials Theories: The student should explain: - - Causes of chemical hazards - Importance of reading manufacturer's instructions before operating machine Circumstantial knowledge Detailed knowledge about: - OSHA rules and regulations - Workshop rules and regulations	The following tools, equipment and safety gears are to be available: - Fire extinguisher - Power Machines - Overalls - Gloves - Safety boots - Safety clear glasses - First aid kit - First aid poster - Helmet - 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		
				wastes as per OHS				
		(d) Handling electrical hazards	Case Studies: Guide students to use case study of workshop accidents or safety violations to identify causes and preventive measures of electrical hazards Practical work: Guide students on how to handle mechanical hazards Activity: Organize the students in manageable groups to identify mechanical hazards in school premises	The student should be able to: - Select relevant safety gears - Maintain workshop safety - Identify causes of health and safety electrical hazards in a workshop and its surroundings - Interpret different safety signs in a workshop related with electrical hazards - Draw safety signs related with electrical hazards - Use safety gears - Maintain personal safety	Electrical hazards accidents and incidents handled as per OSHA rules and regulations	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: - Handle electrical hazards materials and equipment Principles: The student should explain principles of: - Handling electrical hazardous materials Theories: The student should explain: - - Causes of electrical hazards - Advantages of maintaining electrical hazards in the workshop - Importance of reading the manufacturer's instructions before operating the machine Circumstantial knowledge Detailed knowledge about:	The following tools, equipment and safety gears are to be available: - Fire extinguisher - Power Machines - Overalls - Gloves - Safety boots - Safety clear glasses - First aid kit - First aid poster - Helmet - 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		
				Dispose different types of electrical wastes as per OHS		- OSHA rules and regulations - Workshop rules and regulations		
		(e) Maintaining safety gears	Brainstorm: Guide students to explain the meaning of safety gear Practical work: Guide student on how to maintain safety gears Activity: Organize the students in manageable group to identify different personal safety gears	The student should be able to: - Select relevant safety gears - Maintain workshop safety gears - Interpret different safety gear signs - Draw different safety gear signs - Clean workshop, tools, equipment and workshop surroundings - Store tools, equipment and safety gear - Use safety gears	Safety gears are maintained as per workshop rules and regulations	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: - Maintain safety gears Principles: The student should explain the principles of: - Handling safety gears Theories: The student should explain: - - Types of safety gear - Advantages of maintaining safety gear - importance of colour code on safety gears Circumstantial knowledge Detailed knowledge about: OSHA rules and regulations	The following tools, equipment and safety gears are to be available: - Overalls - Gloves - Safety boots - Safety clear glasses - First aid kit - First aid poster - Helmet - Mask - Safety posters	
	1.3 Handling fire accidents	(a) Handling firefighting	Think-ink-pair-share:	The student should be able to:	firefighting equipment and materials	Knowledge evidence: Detailed knowledge of:	The following tools, equipment and safety gears	52

Module title (main competence)	Unit title (specific competences)	Elements (learning 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	Guide students through think-ink-pair-share to describe the concepts related to fire accidents and fire fighting Guest speaker: Invite the expert to facilitate and guide the students to identify firefighting principles Activity: Organize the students in manageable group to identify different firefighting equipment and materials	• Select tools, equipment and safety gears • Apply right class of fire extinguisher • Apply right class of firefighting materials • Check and test fire extinguishers • Observe safety precautions • Clean up tools, equipment and working place • Store tools, equipment and safety gears	handled as per rules and regulations	Method used: The student should explain how to: • Identify different type of fire extinguisher • Apply the right type of fire extinguishers • Apply right type of firefighting materials Principles: The student should explain principles involved in: Handling firefighting equipment and materials Theories: The student should explain: - • Types of fire extinguishers • Handle different types of fire extinguishers • Importance of checking and servicing fire extinguishers Circumstantial knowledge Detailed knowledge about: OSHA rules and regulations	are to be available: • Fire extinguishers • Firefighting materials • First aid kit • Gloves • Safety boots • Overall • Safety clear glasses • Fire blanket	

Module title (main competence)	Unit title (specific competences)	Elements (learning 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) Handling different types of fire	Brainstorm: Guide students to explain different types of fire Guest speaker: Invite the expert to facilitate and guide the students to identify firefighting principles Activity: Organize the students in manageable group to identify different types of fire	The student should be able to: - Select tools, equipment and safety gears - Identify common classes of fire - React correctly and safely to different types of fire - Handle different types of fire - Observe safety precautions while dealing with different types of fire - Clean up tools, equipment and working place - Store tools, equipment and safety gears	Different types of fire handled as per rules and regulations	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: Handle different types of fire Principles: The student should explain principles of: Handling different types of fire Theories: The student should explain: - - Importance of handling different types of fire - Types and common classes of fire Circumstantial knowledge Detailed knowledge about: OSHA rules and regulations	The following tools, equipment and safety gears are to be available: - Fire extinguishers - Firefighting materials - First aid kit - Gloves - Safety boots - Overall - Safety clear glasses	
	1.4 Performing first aid	(a) Performing artificial respiration	Group discussion: Guide students in manageable groups to discuss and	The student should be able to: Select tools and equipment	Artificial respiration conforms to medical requirements and standards	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to perform	The following tools, equipment and safety gears are to be available: First aid Kit	51

Module title (main competence)	Unit title (specific competences)	Elements (learning activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			come up with the meaning and procedures of performing artificial respiration Interactive simulation: Guide students through interactive simulation and animation to visualize the principles and procedure for performing artificial respiration	- Perform artificial respiration - Sterilize first aid tools - Observe safety precautions		- Mouth-to-mouth resuscitation - Chest compressions Principles: The student should principles involved in: Performing artificial respiration Theories: The student should explain: - - Types of artificial respiration - The use of accessories in a first aid kit - Importance of performing artificial respiration Circumstantial knowledge Detailed knowledge about: Medical requirements and standards	- Stretcher - Towel - Overall - Medical gloves - multimedia resources - online resources - simulation software - Safety boots	
		(b) Performing first aid to minor wound scalpels	Brainstorm: Guide students to brainstorm on how to perform first aid to minor wound scalpels	The student should be able to: - Select tools and equipment - Identify types of injuries	First aid offered conforms to medical requirements	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to Performing first aid to minor wound scalpels	The following tools, equipment and safety gears are to be available: - First aid Kit - Free video demonstratio	

Module title (main competence)	Unit title (specific competences)	Elements (learning 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 and animation to visualize the principles and procedure for performing artificial respiration	- Perform artificial respiration - Attend minor wounds - Sterilize first aid tools - Observe safety precautions - Store first aid kit		Principles: The student should explain principles involved in: Performing first aid to minor wound scalpels Theories: The student should explain: - Different types of wounds Circumstantial knowledge Detailed knowledge about: Medical requirements and standards	ns on platforms - Sterilizer - Towel - Overall - Medical gloves - Safety boots - Posters or infographics on wound care steps.	
2.0 Performing bench works	2.1 Performing cutting	(a) Performing straight sawing	Group discussion: Organize the students in manageable groups to describe the concepts related to bench works Demonstration : Organize the students in manageable groups and demonstrate how to perform	The student should be able to: - Interpret drawings - Select tools and equipment - Take measurements - Cut work piece - Check for accuracy - Observe safety precautions - Clean tools, work piece and work place	Pieces of material are cut as per technical drawing and specifications given	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to cut work piece in different sizes Principles: The student should explain the principles of: - Performing straight sawing Theories: The student should explain: - Different types of materials and their properties	The following tools, equipment and safety gears are to be available: - Work bench - Steel rule - Scriber - T-Square - Vernier caliper - Micrometer - Hammer - Anvil - Chisels - File	93

Module title (main competence)	Unit title (specific competences)	Elements (learning 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 by using hacksaw Hands-on activities: Guide students in manageable groups through hands-on activities to perform straight sawing	Store tools, equipment and workplace		- Application of different cutting and measuring tools Circumstantial knowledge: Detailed knowledge about: - First aid and safety regulations - Workshop rules and regulations	- Hacksaw - Power hacksaw - Safety clear glasses - Gloves - Safety boots - Overall	
		(b) Performing angular sawing	Think-ink-pair-share Through think-ink-pair-share guide the students to identify the principles of angular sawing Demonstration : Organize the students in manageable groups and demonstrate how to perform angular sawing Hands-on activities: Guide students	The student should be able to: - Interpret drawings - Select tools and equipment - Take measurements - Cut work piece - Check for accuracy - Observe safety precautions - Clean tools, work piece and work place - Store tools, equipment and workplace	Pieces of material are cut as per technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to perform angular sawing Principles: The student should explain the principles involved in: Performing angular sawing Theories: The student should explain: - Different types of materials and their properties - Cutting Angle - Cutting Forces - Chip Formation Circumstantial knowledge:	The following tools, equipment and safety gears are to be available: - Work bench - Steel rule - Scriber - T-Square - Vernier caliper - File - 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		
			in manageable groups through hands-on activities to perform angular sawing			Detailed knowledge about: • OSHA Rules • Technical drawing and specifications • Workshop rules and regulations		
		(c) Performing chiseling	Brainstorm: Guide students to brainstorm on the concepts and principles related to chiseling Demonstration : Organize the students in manageable groups and demonstrate how to perform Hands-on activities: Guide students through hands-on activities to perform chiseling on different materials	The student should be able to: • Interpret drawings • Select tools and equipment • Take measurements • Cut work piece • Check for accuracy • Observe safety precautions • Clean tools, work pieces 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 perform chiseling of work piece in different sizes Principles: The student should explain the principals involved in performing chiseling Theories: The student should explain: • Procedures and techniques of performing chiseling • Application of different chiseling tools Circumstantial knowledge: Detailed knowledge about: • First aid and safety regulations	The following tools, equipment and safety gears are to be available: • Work bench • Steel rule • Scriber • Chisels • Hand shear • 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		
						Workshop rules and regulations		
	2.2 Performing filing	(a) Performing flat filing	Think-ink-pair-share Through think-ink-pair-share guide the students to describe the concepts and principles related to filing Demonstration : Guide students in manageable groups and demonstrate how to perform flat filing Hands-on activities: Guide students in manageable groups through hands-on activities to to perform flat filing on different materials	The student should be able to: - Interpret drawings - Select tools and equipment - Take measurements and marking - File work piece - Grind work piece - Check for accuracy - Observe safety precautions - Clean tools, work piece and work place - Store tools, equipment and work piece	Flat filled work piece conforms to drawing and specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: - Perform flat filling Principles: The student should explain the principles of: - Taking measurements - Marking work piece - Filing and grinding work piece Theories: The students should: - Meaning of flat filling - Explain applications of flat filled materials - Proper use of files and equipment Circumstantial knowledge: Detailed knowledge about: - First aid and safety regulations - Workshop rules and regulations	The following tools, equipment and safety gears are to be available: - Work bench - flat files - File card - Try square - Steel rule - Scriber - Grinder - Overall - Gloves - Safety clear glasses - Safety boots	93

Module title (main competence)	Unit title (specific competences)	Elements (learning 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 radii filing	Targeted questions: Through target questions guide the students to explain different concepts and principles related to radii filling and mark a workpiece before filling Demonstration : Organize the students in manageable groups and demonstrate how to perform radii filing Activity: Organize the students in manageable group to perform radii filing on different materials	The student should be able to: • Interpret drawings • Select tools and equipment • Take measurements and marking • File work piece • File work piece • Check for accuracy • Observe safety precautions • Clean tools, work piece and work place • Store tools, equipment and work piece	radii filled work piece conforms to drawing and specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: • Mark work piece • File work piece • Grind work piece Principles: The student should explain principles involved in performing radii filing Theories: The student should: • Explain applications of radii filled materials • Proper use of files and equipment Circumstantial knowledge: Detailed knowledge about: • First aid and safety regulations • Workshop rules and regulations	The following tools, equipment and safety gears are to be available: • Work bench • Set of files • File card • Steel rule • Centre punch • Scriber • Grinder • Divider • Hammer • 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		
		(c) Performing angle filing	Brainstorm: Guide students to brainstorm on the procedure for performing angle filling Demonstration Organize the students in manageable groups and demonstrate how to take measurement, mark and file the work piece Activity: Organize the students in manageable group to perform angle filing on different materials	The student should be able to: • Interpret drawings • Select tools and equipment • Take measurements and marking • File work piece • Grind work piece • Check for accuracy • Observe safety precautions • Clean tools, work piece and work place • Store tools, equipment and work piece	Angle filled work piece conforms to drawing and specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: • Perform angle filing Principles: The student should explain the principles involved in performing angle filing: Theories: The student should: • Explain applications of angle filled workpiece • Proper use of files and equipment Circumstantial knowledge: Detailed knowledge about: • Safety precautions • Workshop rules and precautions	The following tools, equipment and safety gears are to be available: • Work bench • Set of files • File card • Try square • Steel rule • Scriber • Grinder • Divider • Hacksaw • Overall • Gloves • Safety clear glasses • Safety boots	
	2.3 Performing drilling	(a) Performing hand drilling on plate	Group discussion: Guide through groups to discuss and	The student should be able to: • Interpret drawings	Drilled hole plate conforms to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to:	The following tools, equipment and safety gears are to be available:	93

Module title (main competence)	Unit title (specific competences)	Elements (learning 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 the concepts related to drilling. Demonstration : Organize the students in manageable groups and demonstrate how to perform hand drilling Hands on activity Organize the students in manageable groups to perform hand drilling	- Select tools, equipment and materials - Mark work piece - Cut work piece to size - Perform drilling - Observe safety precautions - Clean tools, equipment and work place - Store tools, equipment and work piece		- Perform hand drilling process Principles: The student should explain the principles of: - Performing hand drilling Theories: The student should explain: - The meaning of drilling - Drilling procedures - Importance of coolant in drilling process - Materials used to manufacture drill bits - Drill bit cutting angles Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Workshop rules and precautions	- Work bench - Hand drilling machine - Centre punch - Hammer - Set of drill bits - Oil can - Wire brush - Vernier caliper - Safety clear glasses - Gloves - Safety boots - Overalls	
		(b) Carrying out drilling on bench drilling machine	Brainstorm: Guide students to brainstorm on the basic concepts and principles related to bench	The student should be able to: - Interpret drawings - Select tools, equipment and materials	Drilled hole conforms to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: Perform machine drilling process	The following tools, equipment and safety gears are to be available: - Work bench - 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		
			drilling machines Demonstration : Organize the students in manageable groups and demonstrate how to perform drilling on the drilling machine Hands on activity Organize the students in manageable groups to drill different workpieces on drilling machine	- Mark work piece - Cut work piece to size - Perform drilling - Observe safety precautions - Clean tools, equipment and work place - Store tools, equipment and work piece		Principles: The student should explain the principles of: - Drilling - Selection of drilling speed Theories: The student should explain: - drill size and drilling speed - Drilling procedures - Importance of coolant in drilling process Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Workshop rules and precautions	- Hammer - Set of drill bits - Bench drilling machine and accessories - Oil can - Wire brush - Vernier caliper - Safety clear glasses - Gloves - Safety boots - Overalls	
		(c) Performing counter boring drilled holes	Targeted questions Through targeted questions guide the students to explore the concepts related to counter	The student should be able to: - Interpret drawings - Select tools, equipment and materials - Mark work piece	Counter bore drilled holes conforms to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to counter bore process Principles: The student should explain the	The following tools, equipment and safety gears are to be available: - Work bench - Centre punch - 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		
			boring drilled holes. Demonstration : Organize the students in manageable groups and demonstrate how to counter bore drilled holes Hands on activity Organize the students in manageable groups to counter bore drilled holes on different materials	• Cut work piece to size • Perform drilling • Perform reaming • Observe safety precautions • Clean tools, equipment and work place • Store tools, equipment and work piece		principles of counter boring drilled holes Theories: The student should explain: • Meaning of counter boring drilled holes • Counter boring procedures • Importance of coolant in Counter boring process Circumstantial knowledge: Detailed knowledge about: • Safety precautions • Workshop rules and precautions	• Set of drill bits • Counter bore tool • Oil can • Wire brush • Vernier caliper • Safety clear glasses • Gloves • Safety boots • Overalls	
	2.4 Performing riveting	(a) Performing manual riveting	Discussion: Guide students in groups to collaboratively explore the concepts and principles related to reverting	The student should be able to: • Interpret drawings • Select tools, equipment and materials • Mark work piece	Manual Riveted pieces conform to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to perform Manual Riveting in different sizes Principles: The student should explain the principles of: performing Manual Riveting	The following tools, equipment and safety gears are to be available: • Rivet sets • Steel rule • Wire brush • T-Square • Centre punch	86

Module title (main competence)	Unit title (specific competences)	Elements (learning activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			Demonstration : Organize the students in manageable groups and demonstrate how to perform manual reverting Hands on activity Organize the students in manageable groups to perform manual reverting	• Cut work pieces • Drill holes • Perform manual riveting • Observe safety precautions • Clean tools, equipment, work piece and work place • Store tools, equipment and work piece		Theories: The student should explain: • Types of joints • Types of rivets • Application of different materials in riveting • Use of riveting tools and equipment Circumstantial knowledge: Detailed knowledge about: • Safety precautions • Workshop rules and precautions	• Drilling machine • Set of drill bits • Rivet gun • Piece of metal • Chisel	
		(b) Performing pop riveting	Brainstorm: Guide the students to brainstorm on the difference between manual reverting and pop reverting Demonstration : Organize the students in manageable groups and	The student should be able to: • Interpret drawings • Select tools, equipment and materials • Mark work piece • Cut work pieces • Drill holes • Perform pop riveting	Riveted pieces conform to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: • Mark work pieces • Rivet pieces in different sizes Principles: The student should explain the principles of: • Taking measurements • Riveting pieces of metals	The following tools, equipment and safety gears are to be available: • Rivet sets • Steel rule • Wire brush • T-Square • Centre punch • Drilling machine • Set of drill bits	

Module title (main competence)	Unit title (specific competences)	Elements (learning 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 performing pop riveting Hands on activity Organize the students in manageable groups, through hands on skills activities to performing pop riveting	- Observe safety precautions - Clean tools, equipment, work piece and work place - Store tools, equipment and work piece		Theories: The student should explain: - Types of joints - Types of rivets - Application of different materials in riveting Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Workshop rules and precautions	- POP Rivet gun - Piece of sheet metal - Chisel	
		(c) Performing pneumatic riveting	Brainstorm: Guide students to explain pneumatic riveting Practical work: Guide student on how to perform pneumatic riveting Hands-on activities: Guide students in manageable	The student should be able to: - Interpret drawings - Select tools, equipment and materials - Mark work piece - Cut work pieces - Drill holes - Perform pneumatic riveting	pneumatic riveted pieces conform to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to perform pneumatic riveting Principles: The student should explain the principles involved in performing pneumatic riveting Theories: The student should explain: Application of Pneumatic riveted joint	The following tools, equipment and safety gears are to be available: - Rivet sets - Pneumatic rivet gun - Steel rule - Wire brush - T-Square - Centre punch - Drilling machine - Set of drill bits	

Module title (main competence)	Unit title (specific competences)	Elements (learning activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			groups through hands-on activities to perform pneumatic riveting for different components	- Observe safety precautions - Clean tools, equipment, work piece and work place - Store tools, equipment and work piece		- Advantages of Pneumatic riveted joint - Use of Pneumatic rivet guns Circumstantial knowledge: Detailed knowledge about: - Safety precautions - First aid - Workshop rules and regulations - Waste disposal	- Piece of sheet metal - Chisel	
	2.5 Performing threading	(a) Carrying out dieing	Brainstorm: Guide the students to brainstorm on the concepts related to threading Demonstration : Organize the students in manageable groups and demonstrate how to carry out dieing	The student should be able to: - Interpret drawings - Select tools, equipment and materials - Mark work piece - Prepare the work piece - Cut external threads - Observe safety precautions	Cut threads conform to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to carry out dieing Principles: The student should explain the principles involved in carrying out dieing Theories: The student should explain: - The meaning of dies and taps - The function of taps and dies - Types of taps and dies - Thread classifications	The following tools, equipment and safety gears are to be available: - Set of dies and stock wrenches - Work bench - Bench vice - Wire brush - Scriber - Steel rule - Micrometers - Hacksaw	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		
			Hands on activity Organize the students in manageable groups, through hands on skills activities to carry out dieing	- Clean tools, equipment, work piece and work place - Store tools, equipment and work piece		Circumstantial knowledge: Detailed knowledge about: - Safety precautions - First aid - Workshop rules and regulations - Waste disposal	- Thread gauges - Vernier caliper - File - Gloves - Goggles - Safety boots - Overalls	
		(b) Carrying out tapping	Targeted questions: Used targeted questions to guide the students to explore the procedures of tapping Demonstration : Organize the students in manageable groups and demonstrate how to carry out tapping Hands on activity Organize the students in	The student should be able to: - Interpret drawings - Select tools, equipment and materials - Mark work piece - Prepare the work piece - Cut threads - Observe safety precautions - Clean tools, equipment, work piece and work place - Store tools, equipment and work piece	Cut threads conform to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: - Cut internal threads Principles: The student should explain the principles involved in carrying out tapping Theories: The student should explain: - The function of taps - Types of taps - Thread classifications Circumstantial knowledge: Detailed knowledge about: - Safety precautions - First aid	The following tools, equipment and safety gears are to be available: - Set of taps and stock wrenches - Work bench - Set of drill bits - Drilling machine - Thread gauges - Vernier caliper - 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		
			manageable groups, through hands on skills activities to carry out tapping			- Workshop rules and regulations - Waste disposal		
	2.6 Performing metal forming	(a) Bending flat materials	Think-ink-pair-share: Through think-ink-pair-share guide the students to explore the concepts of bending flat materials Demonstration : Organize the students in manageable groups and demonstrate how to bend flat materials Practical work Organize the students in manageable groups, through hands on skills	The student should be able to: - Interpret drawing - Select tools, equipment and work piece - Mark work piece - Clamp work piece on bench vice - Bend work piece - Observe safety precautions - Clean tools, equipment, work pieces and work place - Store tools, equipment and remained material	Bent flat Work piece conforms to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to bend flat materials Principles: The student should explain the principles involved in bending flat materials Theories: The student should explain: - Factors Affecting Bending - Uses of various tools and equipment - Applications of bended flat material Circumstantial knowledge: Detailed knowledge about: - Safety precautions - First aid - Workshop rules and regulations	The following tools, equipment and safety gears are to be available: - Work bench - Try square - Vernier caliper - Steel rule - Hacksaw - Scriber - Anvil - Radius gauges - Leather gloves - Overall - Safety boots - Safety 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		
			activities to bend flat materials			Waste disposal		
		(b) Bending round materials	Targeted questions: Used targeted questions to guide the students to identify the procedures of bending round materials Demonstration : Organize the students in manageable groups and demonstrate how to bend round materials Hands on activity Organize the students in manageable groups, through	The student should be able to: - Interpret drawing - Select tools, equipment and work piece - Mark work piece - Clamp work piece on bench vice - Bend round work piece - Observe safety precautions - Clean tools, equipment, work pieces and work place - Store tools, equipment and remained material	Bent round Work piece conforms to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to bend round materials Principles: The student should explain the principles involved in bending round materials Theories: The student should explain: - Factors Affecting Bending - Uses of various tools and equipment - Applications of bended round material Circumstantial knowledge: Detailed knowledge about: - Safety precautions - First aid	The following tools, equipment and safety gears are to be available: - Work bench - Vernier caliper - Steel rule - Hacksaw - Scriber - Anvil - Centre punch - Hammer - Radius gauges - 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		
			hands on skills activities to bend round materials			- Workshop rules and regulations - Waste disposal		
3.0 Performing welding processes	3.1 Performing arc welding	(a) Performing down hand arc welding bead	Group discussion: Guide students in groups to collaboratively explore the concepts related to welding, types of welding and principles used in down hand arc welding bead Demonstration : Organize the students in manageable groups and demonstrate how to perform down hand arc welding bead Hands on activity Organize the students in	The student should be able to: - Interpret drawings - Select tools, equipment and materials - Mark work piece - Cut or grind work piece - Set welding current - Weld work piece - Remove slag - Observe safety precautions - Clean tools, equipment, work piece, and work place - Store tools and equipment	Welded work piece conforms to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: - Prepare work piece - Setup welding machine Principles: The student should explain the principles of performing down hand arc welding bead Theories: The student should explain: - Types of welding joints - Types of electrodes - Basic welding techniques of welding Circumstantial knowledge: Detailed knowledge about: - Safety precautions - First aid	The following tools, equipment and safety gears are to be available: - AC/DC arc welding machine - Chipping hammer - Welding bench - Steel rule - Set of files - Grinding machine - Welding shield - Leather apron - Gloves - Safety boots - Overall - Safety clear glasses - Tape measure	88

Module title (main competence)	Unit title (specific competences)	Elements (learning 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, through hands on skills activities to perform down hand arc welding bead			- Workshop rules and regulations - Waste disposal		
		(b) Performing down hand v welding	Targeted questions: Used targeted questions to guide the students to explore the procedures and principles of down hand v welding Demonstration : Organize the students in manageable groups and demonstrate how to perform of down hand v welding Hands on activity Organize the students in	The student should be able to: - Interpret drawings - Select tools, equipment and materials - Mark work piece - Cut or grind work piece - Set welding current - Weld work piece - Remove slag - Observe safety precautions - Clean tools, equipment, work piece, and work place - Store tools and equipment	Welded work piece conforms to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to perform down hand V joint Principles: The student should explain the principles performing down hand V joint Theories: The student should explain: - Meaning of down hand V joint - Procedures for welding down hand v joint Circumstantial knowledge: Detailed knowledge about: - Safety precautions - First aid	The following tools, equipment and safety gears are to be available: - AC/DC arc welding machine - Chipping hammer - Welding bench - Steel rule - Set of files - Grinding machine - Welding shield - Leather apron - 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		
			manageable groups, through hands on skills activities to perform of down hand v welding			- Workshop rules and regulations - Waste disposal	- Safety clear glasses - Tape measure	
		(c) Performing down hand butt joint welding	Brainstorm: Guide the students to brainstorm on the procedures, principles and safety measures for welding down hand butt joint Demonstration : Organize the students in manageable groups and demonstrate how to weld down hand butt joint Hands on activity	The student should be able to: - Interpret drawings - Select tools, equipment and materials - Mark work piece - Cut or grind work piece - Set welding current - Weld work piece - Remove slag - Observe safety precautions - Clean tools, equipment, work piece, and work place	Welded work piece conforms to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to performing down hand butt joint Principles: The student should explain the principles involved in Performing down hand butt joint Theories: The student should explain: - Meaning of butt joint welding - Types of welding joints - Differences between butt joint and other welding joints Circumstantial knowledge:	The following tools, equipment and safety gears are to be available: - AC/DC arc welding machine - Chipping hammer - Welding bench - Steel rule - Set of files - Grinding machine - Welding shield - Leather apron - 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		
			Organize the students in manageable groups, through hands on skills activities to weld down hand butt joint	Store tools and equipment		Detailed knowledge about: - Safety precautions - First aid - Workshop rules and regulations - Waste disposal	- Overall - Safety clear glasses - Tape measure	
		(d) Performing down hand tee joint welding	Think-ink-pair-share: Through think-ink-pair-share guide the students to identify the procedure for performing down hand tee joint welding Demonstration : Organize the students in manageable groups and demonstrate how to perform down hand tee joint welding Practical work Organize the students in	The student should be able to: - Interpret drawings - Select tools, equipment and materials - Mark work piece - Cut or grind work piece - Set welding current - Weld work piece - Remove slag - Observe safety precautions - Clean tools, equipment, work piece, and work place - Store tools and equipment	Welded work piece conforms to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to perform down hand tee joint welding Principles: The student should explain the principles involved in performing down hand tee joint welding Theories: The student should explain: - Meaning of down hand tee joint welding - Types of down hand tee joints - Differences between down hand tee joint and other welding joints Circumstantial knowledge:	The following tools, equipment and safety gears are to be available: - AC/DC arc welding machine - Chipping hammer - Welding bench - Steel rule - Set of files - Grinding machine - Welding shield - Leather apron - 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		
			manageable groups, through hands on skills activities to perform down hand tee joint welding			Detailed knowledge about: • Safety precautions • First aid • Workshop rules and regulations • Waste disposal	• Safety clear glasses • Tape measure	
	3.2 Performing gas welding	(a) Using gas welding tools and equipment	Brainstorm: Guide students to brainstorm on the concepts and principles of using gas welding tools and equipment Demonstration : Organize the students in manageable groups and demonstrate how to use gas welding tools and equipment Hands on activity Organize the students in manageable groups, through	The student should be able to: • Interpret drawings • Select tools, equipment and materials • Identify gas welding equipment • Adjust the welding flame • Observe safety precautions • Clean tools, equipment, work piece and work place • Store tools and equipment	Gas welding tools and equipment are well explained as per manufacturer specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to use gas welding tools and equipment Principles: The student should explain the principles involved in gas welding Theories: The student should explain: • Meaning of gas welding • Importance of gas welding over arc welding • Types of gas welded materials • Tools and gas welding equipment • Properties of oxygen and acetylene gas	The following tools, equipment and safety gears are to be available: • Oxy-acetylene gas cylinders • Welding Torch • Pressure Regulators • Flame Igniter • Fire Extinguisher • Steel rule • Safety boots • Overall • Gloves • Leather apron • Gas welding goggles	88

Module title (main competence)	Unit title (specific competences)	Elements (learning 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 skills activities to use gas welding tools and equipment			- Types of gas welded joints Circumstantial knowledge: Detailed knowledge about: - Safety precautions - First aid - Workshop rules and regulations - Waste disposal		
		(b) Performing gas down hand butt joint	Targeted questions: Used targeted questions to guide the students to explore the procedures and principles of performing down hand butt joint Demonstration : Organize the students in manageable groups and demonstrate how to perform	The student should be able to: - Interpret drawings - Select tools, equipment and materials - Take measurements - Prepare welding joints - Perform gas down hand butt joint welding - Observe safety precautions - Clean tools, equipment, work piece and workplace	Welded work piece conforms to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to Perform gas down hand butt joint Principles: The student should explain the principles involved in performing gas down hand butt joint Theories: The student should explain: - Meaning of gas down hand butt joint - Importance of gas down hand butt joint - Types of gas down hand butt joint Circumstantial knowledge:	The following tools, equipment and safety gears are to be available: - Oxy-acetylene gas cylinders - Welding Torch - Pressure Regulators - Flame Igniter - Fire Extinguisher - Steel rule - Safety boots - Overall - 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		
			down hand butt joint welding Hands on activity Organize the students in manageable groups, through hands on skills activities to perform down hand butt joint welding	Store tools and equipment		Detailed knowledge about: - Safety precautions - First aid - Workshop rules and regulations - Waste disposal	- Leather apron - Gas welding goggles	
		(c) Performing gas down hand lap joint welding	ICT based learning: Guide the students to use video clips and multimedia to explore the principles and procedures of performing gas down hand lap joint welding Demonstration : Organize the students in manageable groups and demonstrate	The student should be able to: - Interpret drawings - Select tools, equipment and materials - Take measurements - Prepare welding joints - Carry out gas welding - Observe safety precautions - Clean tools, equipment,	Welded work piece conforms to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to perform gas down hand lap joint Principles: The student should explain the principles involved in performing gas down hand lap joint Theories: The student should explain: - Meaning of gas down hand lap joint - Importance of gas down hand lap joint welding	The following tools, equipment and safety gears are to be available: - Oxy-acetylene gas cylinders and accessories - Hammer - Pair of tongs - Wire brush - Oxy-acetylene welding 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		
			how to perform gas down hand lap joint welding Practical work Organize the students in manageable groups, through hands on skills activities to perform gas down hand lap joint welding	work piece and work place Store tools and equipment		Circumstantial knowledge: Detailed knowledge about: - Safety precautions - First aid - Workshop rules and regulations - Waste disposal	- Oxy-acetylene welding bay - Clamp - Hacksaw - Scriber - Steel rule - Grinding machine - Safety boots - Overall - Gloves - Leather apron - Gas welding goggles	
		(d) Performing brazing	Brainstorm: Guide the students to brainstorm on the concepts related to buzzing Demonstration : Organize the students in manageable groups and demonstrate	The student should be able to: - Interpret drawings - Select tools, equipment and materials - Take measurements - Adjust the welding flame - Perform brazing	blazed work piece conforms to technical specifications and standards	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to perform brazing of different work pieces Principles: The student should explain the principles of involved in brazing Theories: The student should explain: - Meaning of brazing - Importance of brazing	The following tools, equipment and safety gears are to be available: - Oxy-acetylene gas cylinders - Welding Torch - Pressure Regulators - Flame Igniter	

Module title (main competence)	Unit title (specific competences)	Elements (learning 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 buzzing Hands on activity Organize the students in manageable groups, through hands on skills activities to perform buzzing	Observe safety precautions - Clean tools, equipment, work piece and work place - Store tools and equipment		- Types of brazed materials - Types of brazed joints Circumstantial knowledge: - Detailed knowledge about: - Safety precautions - First aid - Workshop rules and regulations - Waste disposal	- Fire Extinguisher - Steel rule - Safety boots - Overall - Gloves - Leather apron - Gas welding goggles	
	3.3 Performing soldering	(a) Carrying out thin metal soldering	Group discussion: Guide students in groups to collaboratively explore the concepts related to soldering and thin metal soldering Demonstration : Organize the students in manageable groups and demonstrate how to carry	The student should be able to: - Select tools, equipment and material - Prepare parts to be soldered - Carry out soldering - Observe safety precautions - Clean tools, equipment, work piece and work place - Store tools, equipment and work piece	Soldered joint conforms to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to carrying out thin metal soldering Principles: The student should explain the principles involved in soldering Theories: The student should explain: - Soldering process - Importance of soldering - Tools used in soldering process	The following tools, equipment and safety gears are to be available: - Charcoal stove/blow lamp - Wire brush - Work bench - Combination plier - Tin snip - Heat-Resistant 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		
			out thin metal soldering Hands on activity Organize the students in manageable groups, through hands on skills activities to carry out thin metal soldering			- Importance of cleaning parts to be soldered Circumstantial knowledge: Detailed knowledge about: - Safety precautions - First aid - Workshop rules and regulations - Waste disposal	- Overall - Safety boots	
		(b) Performing electronic components soldering	ICT based learning: Guide the students to use video clips and multimedia to explore the procedures and principles of performing electronic components soldering Demonstration : Organize the students in manageable groups and demonstrate	The student should be able to: - Select tools, equipment and material - Prepare parts to be soldered - Carry out soldering - Observe safety precautions - Clean tools, equipment, work piece and work place - Store tools, equipment and work piece	Soldered joint conforms to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: performing electronic components soldering Principles: The student should explain the principles involved in performing electronic components soldering Theories: The student should explain: - Soft soldering process - Importance of soft soldering flux - Tools used in soft soldering process	The following tools, equipment and safety gears are to be available: - Soldering gun - Wire brush - Work bench - Combination plier - Wire stripper - 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		
			how to perform electronic components soldering Practical work Organize the students in manageable groups, through hands on skills activities to perform electronic components soldering			- Importance of cleaning parts to be soldered Circumstantial knowledge: Detailed knowledge about: - Safety precautions - First aid - Workshop rules and regulations - Waste disposal		
4.0 Building simple electric circuits	4.1 Constructing simple electric circuits	(a) Constructing simple series circuits	Brainstorm: Guide students to brainstorm on the concepts and principles of constructing simple series circuits in different arrangements Demonstration : Organize the students in manageable groups and demonstrate	The student should be able to: - Interpret circuit diagram - Select tools, equipment, materials and relevant PPE - Select components - Construct series circuit - Solder constructed circuits	Constructed simple series circuits operate as per standards and specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to construct simple series circuits electrical components in series, n circuits Principles: The student should explain principle involved in constructing simple series circuits Theories: The student should explain:	The following tools, equipment and safety gears are to be available: - Work bench - Electric circuit board - Wire stripper - soldering iron - side cutter plier - combination plier	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		
			how to construct different electric circuits Practical Work: Guide students through hands-on activities to construct simple series circuits	• Test constructed circuits • Observe safety precautions • Clean tools, equipment and work place • Store tools, equipment and materials		• The concept of basic electricity and magnetism • Characteristics of series circuits • Application of Ohm's law in series circuit • Electrical symbols • Application of series circuit Circumstantial knowledge: Detailed knowledge about: • Safety precautions • First aid • Workshop rules and regulations • Waste disposal	• Measuring tape • Digital multimeters • DC Test lamp • Overall • Gloves • Safety clear glasses • Safety boots	
		(b) Constructing simple parallel circuits	Think-ink-pair-share: Through think-ink-pair-share guide the students to identify the characteristic of simple parallel circuits Demonstration :	The student should be able to: • Interpret circuit diagram • Select tools, equipment, materials and relevant PPE • Select components • Construct parallel circuit	Constructed simple parallel circuits operates as per standards and specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: • Apply Ohm's law parallel circuit • Connect different electrical components in parallel, n circuits Principles: The student should explain principle	The following tools, equipment and safety gears are to be available: • Work bench • Electric circuit board • Wire stripper • soldering iron	

Module title (main competence)	Unit title (specific competences)	Elements (learning activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			Organize the students in manageable groups and demonstrate how to construct simple parallel circuits Practical work Organize the students in manageable groups, through hands on skills activities to construct simple parallel circuits	- Solder constructed circuits - Test constructed circuits - Observe safety precautions - Clean tools, equipment and work place - Store tools, equipment and materials		of constructing parallel circuits Theories: The student should explain: - Characteristics of parallel circuits - Application of Ohm's law in parallel circuit Circumstantial knowledge: Detailed knowledge about: - Safety precautions - First aid - Workshop rules and regulations - Waste disposal	- side cutter plier - combination plier - Measuring tape - Digital multimeters - DC Test lamp - Overall - Gloves - Safety clear glasses - Safety boots	
		(c) Constructing simple combination circuits	Think-ink-pair-share: Through think-ink-pair-share guide the students to identify the characteristic of simple series circuits	The student should be able to: - Interpret circuit diagram - Select tools, equipment, materials and relevant PPE - Select components	Constructed simple combination circuits operates as per standards and specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: - Apply Ohm's law parallel circuit - Connect different electrical components	The following tools, equipment and safety gears are to be available: - Work bench - Electric circuit board - Wire stripper	

Module title (main competence)	Unit title (specific competences)	Elements (learning activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			Demonstration : Organize the students in manageable groups and demonstrate how to construct simple series circuits Practical work Organize the students in manageable groups, through hands on skills activities to construct simple series circuits	- Construct combination circuit - Solder constructed circuits - Test constructed circuits - Observe safety precautions - Clean tools, equipment and work place - Store tools, equipment and materials		in combination, n circuits Principles: The student should explain principle of constructing combination circuits Theories: The student should explain: - Characteristics of combination circuits - Application of Ohm's law in combination circuit Circumstantial knowledge: Detailed knowledge about: - Safety precautions - First aid - Workshop rules and regulations - Waste disposal	- soldering iron - side cutter plier - combination plier - Measuring tape - Digital multimeters - DC Test lamp - Overall - Gloves - Safety clear glasses - Safety boots	
		(d) Servicing circuit connectors	Brainstorm: Guide students brainstorm on the meaning of circuit connectors Hands-on activities: Guide students in manageable	The student should be able to: - Select tools, equipment, materials and relevant PPE - Service circuit connectors - Test circuit connectors	Serviced circuit connectors operates as per standards and specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to connect and disconnect different circuit connectors Principles: The student should explain principle	The following tools, equipment and safety gears are to be available: - Work bench - Electric circuit board - Wire stripper	

Module title (main competence)	Unit title (specific competences)	Elements (learning activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			groups through hands-on activities to service circuit connectors of different wiring systems	- Observe safety precautions - Clean tools, equipment and work place - Store tools, equipment and materials		involved in servicing circuit connectors Theories: The student should explain: - Types of circuit connectors - Key considerations When choosing a connector Circumstantial knowledge: Detailed knowledge about: - Safety precautions - First aid - Workshop rules and regulations - Waste disposal	- soldering iron - side cutter plier - combination plier - Measuring tape - Digital multimeters - DC Test lamp - Overall - Gloves - Safety clear glasses - Safety boots	
	4.2 Measuring electric quantities	(a) Measuring voltage in the circuit	Group discussion: Guide students in groups to collaboratively explain different electrical parameters and how to measure them Demonstration:	The student should be able to: - Select tools, equipment, materials and relevant PPE - Connect simple electric circuits - Identify measuring points - Measure electrical voltage	Measured voltage values conform to standard values	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: Measure components voltages Principles: The student should explain principle involved in measuring voltage in the circuit Theories: The student should explain:	The following tools, equipment and safety gears are to be available: - Dry cell 12V battery - Digital Multimeters - Combination Plier - Work bench	91

Module title (main competence)	Unit title (specific competences)	Elements (learning activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			Organize the students in manageable groups and demonstrate how to measure voltage in the circuit Hands on activity Organize the students in manageable groups, through hands on skills activities to measure voltage in the circuit	- Observe safety - Clean tools, equipment and work place - Store tools and equipment		- Procedure for measuring voltage in a circuit or component - Meaning of Electromotive Force (EMF) - Voltage Drop (V,d) - Potential Difference (P d) - Application of colour codes Circumstantial knowledge: Detailed knowledge about: - Safety precautions - First aid - Workshop rules and regulations	- Work bench light - Power supply - Safety boots - Safety gloves - Overall	
		(b) Measuring current in the circuit	Brainstorm: Guide students to brainstorm on the concepts and principles of measuring current in the circuit Demonstration : Organize the students in	The student should be able to: - Select tools, equipment, materials and relevant PPE - Connect simple electric circuits - Measure electrical current	Measured current values conform to standard values	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to measure electrical current Principles: The student should explain principle involved in measuring electric currents Theories: The student should explain:	The following tools, equipment and safety gears are to be available: - Digital Multimeters - Combination Plier - 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		
			manageable groups and demonstrate how to measure current in the circuit Hands on activity Organize the students in manageable groups, through hands on skills activities to measure current in the circuit	- Observe safety - Clean tools, equipment and work place - Store tools and equipment		- Procedures for measuring current in a circuit - Key factors to consider when measuring electric current Circumstantial knowledge: Detailed knowledge about: - Safety precautions - First aid - Workshop rules and regulations	- Work bench light - Power supply - Safety boots - Safety gloves - Overall	
		(c) Measuring resistance in the circuit	Think-ink-pair-share: Through think-ink-pair-share guide the students to measure resistance in the circuit Demonstration : Organize the students in manageable groups and demonstrate	The student should be able to: - Select tools, equipment, materials and relevant PPE - Connect simple electric circuits - Measure electrical resistance - Observe safety - Clean tools, equipment and workplace	Measured resistance values conform to standard values	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to measure electrical resistance Principles: The student should explain principle of involved in measuring electrical resistance Theories: The student should explain: Procedures for measuring resistance in a circuit or component	The following tools, equipment and safety gears are to be available: - Digital Multimeters - Combination Plier - Work bench - Work bench light - Power supply - Safety boots - Safety 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		
			how to measure resistance in the circuit Practical work: Organize the students in manageable group to measure resistance in the circuit or components	Store tools and equipment		- Key factors to consider when measuring electric resistance Circumstantial knowledge: Detailed knowledge about: - Safety precautions - First aid - Workshop rules and regulations		
		(d) Measuring power in the circuit	Brainstorm: Guide students to explain power in the circuit Demonstration : Organize the students in manageable groups and demonstrate how to measure power in the circuit Activity: Organize the students in manageable	The student should be able to: - Select tools, equipment, materials and relevant PPE - Connect simple electric circuits - Measure electrical power - Observe safety - Clean tools, equipment and work place - Store tools and equipment	Measured power values conform to standard values	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to measure electrical power Principles: The student should explain principle involved in measuring electrical power Theories: The student should explain: - Ohm's law - Importance of measuring power in a circuit - Key factors to consider when	The following tools, equipment and safety gears are to be available: - Digital Multimeters/ wattmeter - Combination Plier - Work bench light - Power supply - Safety boots - Safety 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		
			group to measure power in the circuit			measuring electric power Circumstantial knowledge: Detailed knowledge about: - Safety precautions - First aid - Workshop rules and regulations		
5.0 Maintaining of wheels and tyres	5.1 Replacing tyres	(a) Replacing worn tyre	Group discussion: Guide students in groups to collaboratively describe the concepts related to tyres and procedures for replacing tyres Demonstration : Organize the students in manageable groups and demonstrate how to replace worn tyre Hands on activity	The student should be able to: - Select tools and equipment - Park vehicle safely - Secure the vehicle - Loosen the lug nuts - Lift the vehicle - Remove the worn tire - Mount the new tire - Secure the lug nuts - Lower the vehicle - Observe safety precautions	Replaced worn tyre conforms to technical specifications and standards	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to replace tyres Principles: The student should explain the principles involved in replacing tyres Theories: The student should explain: - Meaning of tyres - Construction of tyres - Functions of tyres - Types of tyres - Interpretation of tyre dimensions and specifications - Properties of tyres - Importance of replacing worn tyre	The following tools, equipment and safety gears are to be available: - Vehicle - Stopper/blocks - Jack - Wheel spanner - Air compressor - Pressure gauge - Tyre lever - Plier - Gloves - Safety boots - Overall	51

Module title (main competence)	Unit title (specific competences)	Elements (learning activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge assessment		
			Organize the students in manageable groups, through hands on skills activities to replace worn tyre	- Clean tools, equipment and workplace - Store tools and equipment		Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacturer's services manual book	- Safety clear glasses - Mask	
		(b) Refilling pressure and foam material in tyre	Brainstorm: Guide the students to brainstorm on the procedures and principles of refilling pressure and foam materials in the tyre Demonstration : Organize the students in manageable groups and demonstrate how to refill pressure and foam material in tyre Hands on activity	The student should be able to: - Select tools and equipment - Inspect tyres for under pressure - refill pressure and foam material in tyre - Observe safety precautions - Clean tools, equipment and work place - Store tools and equipment	Refilled pressure and foam material tyre conforms to technical specifications and standards	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to refill pressure and foam material in tyre Principles: The student should explain the principles involved refilling pressure and foam material in tyre Theories: The student should explain: - Functions of pressure and foam material in tyres - Importance of refilling pressure and foam material in tyre Circumstantial knowledge: Detailed knowledge about:	The following tools, equipment and safety gears are to be available: - Vehicle - Stopper/blocks - Jack - Wheel spanner - Air compressor - Pressure gauge - Tyre lever - 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		
			Organize the students in manageable groups, through hands on skills activities to refill pressure and foam material in tyre			- Safety precautions - Manufacturer's services manual book		
		(c) Performing tyre rotation	Think-ink-pair-share: Through think-ink-pair-share guide the students to explain the meaning and procedures for tyre rotation Demonstration : Organize the students in manageable groups and demonstrate how to perform tyre rotation Practical work Organize the students in manageable	The student should be able to: - Select tools and equipment - Perform tyre rotation - Observe safety precautions - Clean tools, equipment and work place - Store tools and equipment	Rotated tyre conforms to technical specifications and standards	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to perform tyre rotation Principles: The student should explain the principles of: performing tyre rotation Theories: The student should explain: Importance of performing tyre rotation Circumstantial knowledge: Detailed knowledge about: - Safety precautions while performing tyre rotation - Safe handling of work tools and equipment	The following tools, equipment and safety gears are to be available: - Vehicle - Stopper/blocks - Jack - Wheel spanner - File - Knife - Valve key - Plier - 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		
			groups, through hands on skills activities to perform tyre rotation			Waste disposal		
	5.2 Repairing tube and tubeless tyres	(a) Repairing tube tyre	Targeted questions: Used targeted questions to guide the students to explore the differences between tubed and tubeless tyre Demonstration : Organize the students in manageable groups and demonstrate how to repair tube tyres Hands on activity Organize the students in manageable groups, through	The student should be able to: - Select tools and equipment - Repair tube tyre - Check tyre pressure - Observe safety precautions - Clean tools, equipment and work place - Store tools and equipment	Repaired tube 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 involved in repairing of tube tyres Theories: The student should explain: - Meaning of tubed tyre - Advantages and disadvantages of tubed tyres - Tread wear pattern - Factors affecting tyre life - Importance of maintaining tyre pressure Circumstantial knowledge: Detailed knowledge about:	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	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		
			hands on skills activities to repair tube tyres			• Safety precautions • Manufacturer's services manual book	• Hot vulcanizing machine • Wheel blocks • Support/safety stands • Safety boots • Overalls • Gloves • Safety clear glasses	
		(b) Repairing tubeless tyre	ICT based learning: Guide the students to use video clips and multimedia to identify the advantages of tubeless tyres Demonstration : Organize the students in manageable groups and demonstrate how to repair tubeless tyres Practical work	The student should be able to: • Select tools and equipment • Repair tubeless tyre • Check tyre pressure • Observe safety precautions • Clean tools, equipment and work place • Store tools and equipment	Repaired tubeless tyre conforms to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to repair tubeless tyre Principles: The student should explain the principles involved in repairing of tubeless tyre Theories: The student should explain: • Meaning of tubeless tyre • Advantages of tubeless tyres • Tread wear pattern • Factors affecting tyre life	The following tools, equipment and safety gears are to be available: • Vehicle • Jacks • Wheel spanners • Air compressor • Puncture repair kit • Pressure gauge • 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		
			Organize the students in manageable groups, through hands on skills activities to repair tubeless tyres			- Importance of maintaining tyre pressure Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacturer's services manual book	- Hot vulcanizing machine - Wheel blocks - Support/safety stands - Safety boots - Overalls - Gloves - Safety clear glasses	
	5.3 Performing wheel balancing	(a) Carrying out static balance	Targeted questions: Used targeted questions to guide the students to explore the meaning and procedures for performing wheel balance Demonstration : Organize the students in manageable groups and demonstrate how to perform wheel balancing	The student should be able to: - Select tools and equipment - Perform inspection - 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 involved in static wheel balancing Theories: The student should explain: - The concept of wheel balance - Types of wheel balancing machines - Importance of static wheel balancing Circumstantial knowledge:	The following tools, equipment and safety gears are to be available: - Vehicle - Wheel balancing machine, tools and accessories - Balancing weights - Wheels and tyres - Jack - Wheel spanner	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		
			Hands on activity Organize the students in manageable groups, through hands on skills activities to perform wheel balancing			Detailed knowledge about: • Safety precautions • Manufacturer's services manual book	• Service manual • Pressure gauge • Blocks/wedges • Safety stand • Gloves • Safety boots • Overall • Safety clear glass	
		(b) Carry out dynamic balance	Brainstorm: Guide the students to brainstorm on dynamic balance Demonstration : Organize the students in manageable groups and demonstrate how to perform dynamic balance Hands on activity Organize the students in	The student should be able to: • Select tools and equipment • Perform inspection • 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 involved in dynamic wheel balancing Theories: The student should explain: • The concept of dynamic wheel balance • Importance of dynamic 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 • Jack • 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		
			manageable groups, through hands on skills activities to perform dynamic balance			Circumstantial knowledge: Detailed knowledge about: • Safety precautions • Manufacturer's services manual book	• 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	Brainstorm: Guide students to explain wheel hub Practical work: Guide student on how to Service wheel hub Hands-on activities: Guide students in manageable groups through hands-on activities to	The student should be able to: • Select tools and equipment • Perform inspection • Service wheel hub components • Test wheel hub • Observe safety precautions • Clean tools, equipment and work place • Store tools and equipment	Serviced wheel hub conforms to manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to service wheel hub components Principles: The student should explain the principles of involved in servicing wheel hub components Theories: The student should explain: • Meaning of wheel hub • Function of wheel hubs • Types of wheel hubs • Types of bearings	The following tools, equipment and safety gears are to be available: • Vehicle • Jack • Tool kit • Service manual • Wheel spanner • Stoppers/blocks/wedge • Overall • Safety boots • Gloves • Safety clear glasses	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		
			Service wheel hub			- Importance of wheel hub service Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacturer's services manual book		
		(b) Adjusting wheel bearing taps play	Think-ink-pair-share: Through think-ink-pair-share guide the students to explain the meaning of wheel bearing Demonstration: Organize the students in manageable groups and demonstrate how to adjust wheel bearing taps play Practical work Organize the students in manageable	The student should be able to: - Use service manual - Select tools and equipment - Adjust wheel bearing free play - Test wheel hub - Observe safety precautions - Clean tools, equipment and work place - Store tools and equipment	Adjusted wheel bearing taps play conforms to manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to adjust wheel bearing free play Principles: The student should explain the principles involved in adjusting wheel bearing taps play Theories: The student should explain: - The concept of wheel bearing taps play - Function of wheel bearing - Types of wheel bearings - Importance of wheel bearing adjustment Circumstantial knowledge:	The following tools, equipment and safety gears are to be available: - Vehicle - Jack - Tool kit - Service manual - Wheel spanner - 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		
			groups, through hands on skills activities to adjust wheel bearing taps play			Detailed knowledge about: • Safety precautions • Manufacturer's services manual book		

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	Services Assessment	Knowledge Assessment		
1.1 Building simple electronic circuits	1.1. Determining characteristics of active electronic components	(a) Testing characteristics of a diode	Group discussion: Guide students to discuss and explore the concepts and principles of active electronics components. Also encourage them to use internet to search for different facts about diodes Demonstration: Organize the students in manageable groups and demonstrate how to test characteristics of different diodes Hands-on activities: Guide students in manageable groups through hands-on activities to test, record and interpret	- Select relevant safety gear, tools and equipment - Identify diode terminals - Test diode - Read and interpret diode readings from data books - Observe safety regulations - Clean tools, equipment and work place - Store tools and equipment	A tested diode conforms to specifications as per electronic component data books	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to test a diode Principles: The student should explain the principles related to testing characteristics of a diode Theories: The student should explain: - Types of diodes - Characteristics of diode in Forward and reverse bias - Diode symbols Circumstantial knowledge: Detailed knowledge about: - Electronic component data books	The following tools, equipment and safety gears are to be available: - Digital and analogue multimeters - Diodes - Oscilloscope - Curve tracer - Tool kit - Work bench - Gloves - Overcoat - Overall - Boots	51

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			different characteristics of diodes					
		(b) Testing characteristics of a transistor	Think-ink-pair-share: Guide students through think-ink-pair-share to explain the concepts related to transistor Demonstration: Organize the students in manageable groups and demonstrate how to test characteristics of different transistors Hands-on activities: Guide students in manageable groups through hands-on activities to test, record and interpret different characteristics of transistors	- Select relevant safety gears, tools and equipment - identify transistor terminals - Test transistor - Read and interpret transistor readings as per data book - Observe safety regulations - Clean tools, equipment and work place - Store tools and equipment	A tested transistor conforms to specifications as per electronic component data books	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to test a transistor Principles: The student should explain the principals involved in testing characteristics of a transistor Theories: The student should explain: - Types of transistor - Function of transistor - Characteristics of transistor - Transistor symbols Circumstantial knowledge: Detailed knowledge about: - Electronic component data books	The following tools, equipment and safety gears are to be available: - Digital and analogue multimeters - Transistors - Oscilloscope - Curve tracer - Tool kit - 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	Services Assessment	Knowledge Assessment		
		(c) Testing characteristics of thyristors	Brainstorm: Guide the students to define thyristors, identify and draw its symbols Experimentation: Guide students through experimentation to test characteristics of different thyristors and plot the graphs Activity: Organize the student in manageable group to test, record and interpret characteristics of thyristors Also guide them to use internet to search for different fact about diodes	• Select relevant safety gears, tools and equipment • identify thyristors terminals • Test thyristor • Record test results • Interpret results • Observe safety regulations • Clean tools, equipment and work place • Store tools and equipment	A tested thyristors conforms to specifications as per electronic component data books	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to test Thyristors Principles: The student should explain the principles of: • thyristors Operations Theories: The student should explain: • Types of thyristor • Characteristics of a thyristor • Difference between thyristor and transistors • Application of thyristors in motor vehicle electronic systems Circumstantial knowledge: Detailed knowledge about: • Electronic component data books	The following tools, equipment and safety gears are to be available: • Digital and analogue multimeters • Thyristors • Oscilloscope • Curve tracer • Tool kit • Work bench • Gloves • Overcoat • Overall • Boots	
		(d) Testing characteristics	Brainstorm:	• Select relevant	A tested opto-	Knowledge evidence:	The following tools, 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	Services Assessment	Knowledge Assessment		
		of opto-electronic devices	Guide the students to brainstorm on the principles and concepts of testing characteristics of opto-electronic devices Experimentation: Guide students through experimentation to test characteristics of different opto-electronic devices Hands-on activities: Guide students in manageable groups through hands-on activities to test, record and interpret characteristics of opto-electronic devices	safety gears, tools and equipment • identify different types of opto-electronic devices • Test opto-electronic devices • Interpret results • Observe safety regulations • Clean tools, equipment and work place • Store tools and equipment	electronic devices conforms to specifications as per electronic component data books	Detailed knowledge of: Method used: The student should explain how to test opto-electronic devices Principles: The student should explain the principles of: • opto-electronic devices • Operations instruments Theories: The student should explain: • Types of opto-electronic devices • Characteristics of opto-electronic devices • Semi-conductor and conductor material • opto-electronic devices symbols • Variation of component performance with temperature Circumstantial knowledge:	and safety gears are to be available: • Digital and analogue multimeters • Opto-electronic devices • Oscilloscope • Curve tracer • Tool kit • 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	Services Assessment	Knowledge Assessment		
						Detailed knowledge about: - Electronic component data sheet - Safety Precautions		
		(e) Testing characteristics of integrated circuits	Brainstorm: Guide students to brainstorm on the principles and concepts to test characteristics of integrated circuits Demonstration: Organize the students in manageable groups and demonstrate how to Test the characteristics of integrated circuits Hands-on activities: Guide students in manageable groups through hands-on activities to test, record and interpret characteristics of integrated circuits	- Select relevant safety gears, tools and equipment - identify different integrated circuits - Test integrated circuits - Record test results - Interpret results - Observe safety regulations - Clean tools, equipment and work place - Store tools and equipment	A tested integrated circuits conforms to specifications as per electronic component data sheets	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to test ICs Principles: The student should explain the principles involved in testing characteristics of integrated circuits Theories: The student should explain: - Types of opto-ICs - Characteristics of ICs - ICs symbols - Variation of component performance with temperature Circumstantial knowledge:	The following tools, equipment and safety gears are to be available: - Digital and analogue multimeters - ICs - devices - Oscilloscope - Curve tracer - Tool kit - Work bench - Gloves - Overcoat - Overall - Boot	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						Detailed knowledge about: electronic component data books		
	1.2 Determining the characteristics of passive electronic components	(a) Testing characteristics of resistor	Think-ink-pair-share: Guide students through think-ink-pair-share to explain the concepts related to passive electronic components Demonstration: Organize the students in manageable groups and demonstrate how to measure the resistance of the resistor, by using multimeter and color code table Hands-on activities: Guide students in manageable groups through hands-on activities to test, record and interpret	The student should be able to: - Select relevant safety gears, tools and equipment - Identify resistor - Measure resistance of resistor by using multimeter - Use color code table to find the value of resistance - Interpret standard tested results - Observe safety regulations - Clean tools, equipment and workplace	A tested resistor conforms to specifications as per electronic component data books	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to test Characteristics of resistors Principles: The student should explain the principles involved in testing Characteristics of resistors Theories: The student should explain: - Characteristics of resistors - resistor symbols - Applications of resistors - Factors affecting resistance of resistors Circumstantial knowledge:	The following tools, equipment and safety gears are to be available: - Digital and analogue multimeters - Resistors - Oscilloscope - Curve tracer - Tool kit - Work bench - Gloves - Overcoat - Overall - Boots	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	Services Assessment	Knowledge Assessment		
			characteristics of resistor	Store tools, equipment and components		Detailed knowledge about: - Safety precautions in - electronic component data sheet		
		(b) Test characteristics of capacitor	Brainstorm: Guide students to brainstorm on the principles and concepts to test characteristics of capacitor Demonstration: Organize the students in manageable groups and demonstrate how to test the characteristics of capacitor Hands-on activities: Guide students in manageable groups through hands-on activities to test, record and interpret characteristics of capacitor	The student should be able to: - Select relevant safety gears, tools and equipment - Identify capacitors - Measure capacitance by using multimeter - Use color code table to find the value of capacitance - Record test results - Interpret standard test results - Clean tools, equipment and workplace	A tested capacitor conforms to specifications as per electronic component data books	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to test Characteristics of capacitor Principles: The student should explain the principles involved in testing Characteristics of capacitor Theories: The student should explain: - Types of capacitors - Characteristics of capacitors - capacitors symbols - Applications of capacitors	The following tools, equipment and safety gears are to be available: - Digital and analogue multimeters - Capacitors - Oscilloscope - Curve tracer - Tool kit - 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	Services Assessment	Knowledge Assessment		
				Store tools, equipment and components		- Factors affecting capacitance of capacitors Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Electronic component data sheet		
		(c) Test characteristics of inductor	Brainstorm: Guide students to brainstorm on the principles and concepts to test characteristics of inductor Demonstration: Organize the students in manageable groups and demonstrate how to test the characteristics of the inductor Hands-on activities: Guide students in manageable groups through hands-on activities to test,	The student should be able to: - Select relevant safety gears, tools and equipment - Identify inductors - Measure inductance by using multimeter - Use colour code table to find the value of inductance - Record test results - Interpret standard test results	A tested inductor conforms to specifications as per electronic component data books	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to test Characteristics of inductor Principles: The student should explain the principles involved in testing Characteristics of inductor Theories: The student should explain: - Characteristics of inductors - Inductor symbols	The following tools, equipment and safety gears are to be available: - Digital and analogue multimeters - Inductors - Oscilloscope - Curve tracer - Tool kit - 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	Services Assessment	Knowledge Assessment		
			record and interpret characteristics of inductor	- Observe safety regulations - Clean tools, equipment and workplace - Store tools, equipment and components		- Applications of inductors - Factors affecting inductance of inductors Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Electronic component data sheet		
	1.3 Constructing simple electronic circuits	(a) Constructing inductive circuit	Group discussion: Guide students to discuss and explore the concepts and principles of Constructing inductive circuits Demonstration: Organize the students in manageable groups and demonstrate how to construct inductive circuits Hands-on activities: Guide students in manageable groups through hands-on	The student should be able to: - Select relevant safety gears, tools, equipment and material - Interpret the inductive circuit diagram - components - Construct different inductive circuit - Observe safety - Clean tools, equipment and workplace	Constructed circuits function as per technical specification	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: - Connect inductors in series circuit - Connect inductors in parallel circuit - Calculate the value of inductance in series and parallel circuits Principles: The student should explain the principles involved	The following tools, equipment and safety gears are to be available: - Work bench - Electronics board - Inductors - Resistors - Capacitors - Power supply - Tool kit - Measuring tape	54

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			activities to build parallel and series inductive circuits and test their functionality	Store tools, equipment and materials		in constructing an inductive circuit Theories: The student should explain: - Application of inductive circuits - Electrical symbols in inductive circuits - Characteristics of series inductive circuit - Characteristics of parallel inductive circuit - Application of inductive circuits Circumstantial knowledge: Detailed knowledge about: - Safety precautions - electronic component data sheets	- Analogue and digital multimeters - Overall - Gloves - Safety goggles - Safety boots	
		(b) Construct capacitive circuit	Brainstorm: Guide students to brainstorm on the principles and concepts to	The student should be able to: Select relevant safety gears, tools,	Constructed capacitive circuits function as per technical specification	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to:	The following tools, equipment and safety gears are to be available: 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	Services Assessment	Knowledge Assessment		
			construct capacitive circuit Demonstration: Guide the student to demonstrate how to draw and interpret different capacitive circuits Hands-on activities: Guide students in manageable groups through hands-on activities to build parallel and series capacitive circuits and test their functionality	equipment and material • Interpret the capacitive circuit diagram • Select capacitive circuit components • Construct different capacitive circuit • Observe safety regulations • Clean tools, equipment and work place • Store tools, equipment and materials		• Connect capacitors in series circuit • Connect capacitors in parallel circuit • Calculate value of capacitance in series and parallel circuits Principles: The student should explain the principles involved in Constructing capacitance circuit Theories: The student should explain: • Application of capacitance circuits • Characteristics of series capacitance circuit • Characteristics of parallel capacitance circuit • Application of capacitance circuits	• Electronics board • Inductors • Resistors • Capacitors • Power supply • Tool kit • Measuring tape • Analogue and digital multimeters • Overall • Gloves • Safety goggles • 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	Services Assessment	Knowledge Assessment		
						Circumstantial knowledge: Detailed knowledge about: • Safety precautions • electronic component data sheets		
		(c) Constructing resistive circuits	Demonstration: Organize the students in manageable groups and demonstrate how to construct resistive circuits Hands-on activities: Guide students in manageable groups through hands-on activities to build parallel and series resistive circuit and test their functionality	The student should be able to: • Select relevant safety gears, tools, equipment and material • Interpret the resistive circuit diagram • Construct resistive circuit • Observe safety regulations • Clean tools, equipment and work place • Store tools, equipment and materials	Constructed resistive circuits function as per technical specification	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to connect resistors in series and parallel circuit Principles: The student should explain the principles involved in Constructing resistive circuit Theories: The student should explain: • Application of resistive circuits • Characteristics of series resistive circuit • Characteristics of parallel resistive circuit	The following tools, equipment and safety gears are to be available: • Work bench • Electronics board • Inductors • Resistors • Capacitors • Power supply • Tool kit • Measuring tape • Analogue and digital multimeters • Overall • Gloves • Safety 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	Services Assessment	Knowledge Assessment		
						- Application of resistive circuits Circumstantial knowledge: Detailed knowledge about: - Safety precautions - electronic component data sheets	Safety boots	
		(d) Constructing (RLC) circuit	Brainstorm: Guide the students to define RLC circuit, draw and interpret symbols in RLC circuit Demonstration: Organize the students in manageable groups and demonstrate how to Constructing (RLC) circuit Hands-on activities: Guide students in manageable groups through hands-on activities to	The student should be able to: - Select relevant safety gears, tools, equipment and material - Interpret RLC circuit diagram - Select RLC circuit components - Construct different RLC circuit - Observe safety regulations - Clean tools, equipment and work place	Constructed RLC circuits function as per technical specification	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to construct (RLC) circuit Principles: The student should explain the principles involved in constructing different RLC circuits Theories: The student should explain: - Application of RLC circuits - Characteristics of RLC circuits Circumstantial knowledge:	The following tools, equipment and safety gears are to be available: - Work bench - Electronics board - Inductors - Resistors - Capacitors - Power supply - Tool kit - Measuring tape - Analogue and digital multimeters - 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	Services Assessment	Knowledge Assessment		
			Constructing (RLC) circuit	Store tools, equipment and materials		Detailed knowledge about: Safety precautions	- Gloves - Safety goggles - Safety boots	
		(e) Constructing rectifier circuits	Brainstorm: Guide students to brainstorm on the principles and concepts to Constructing rectifier circuits Demonstration: Organize the students in manageable groups and demonstrate how to construct rectifier circuits Hands-on activities: Guide students in manageable groups through hands-on activities of Constructing rectifier circuits	The student should be able to: - Select relevant safety gears, tools, equipment and material - Interpret the rectifier circuit diagram - Select rectifier circuit components - Construct Full wave and half wave rectifier circuit - Observe safety regulations - Clean tools, equipment and work place - Store tools, equipment and materials	Constructed rectifier circuits function as per technical specification	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: - Connect electronic components in half wave rectifier circuit - Connect electronic components in full wave rectifier circuit Principles: The student should explain the principles involved in Constructing rectifier circuits Theories: The student should explain: - Characteristics of full wave and half wave rectifiers - Types of rectifier circuits	The following tools, equipment and safety gears are to be available: - Work bench - Electronics board - Inductors - Resistors - Capacitors - Dioses - Transistors - Transformer - Power supply - Tool kit - Measuring tape - Analogue and digital multimeters - Overall - Gloves - Safety goggles - 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	Services Assessment	Knowledge Assessment		
						- Application and characteristics of rectifier circuits Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Electronic data sheet		
2.0 Carryin g out general mainten ance on electric al and electron ic systems	2.1 Maintaining batteries	(a) \Diagnosing batteries	Group discussion: Organize the students in manageable groups to describe the concepts related to vehicle batteries Practical Work: Guide the student on how to use different tools and equipment to identify and locate battery faults Hands-on activities: Organize the students in manageable groups to diagnose and repair batteries Also encourage	The student should be able to: - Select tools and equipment - Remove and battery from vehicle - Service battery - Mount battery to vehicle - Test battery - Observe safety precautions - Clean tools, equipment and work place - Store tools and equipment	Battery is well diagnosed, tested and faults are identified as per technical or manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to diagnose battery Principles: The student should explain the principles involved in diagnosing battery Theories: The student should explain: - Function of batteries - Types of batteries - Types of battery water - Battery construction - Battery faults	The following tools, equipment and safety gears are to be available: - Vehicle - Battery charger - Wire brush - Tool kit - Multimeter - Plastic container - Thermomete r - Water sucker - Safety clear glasses - Overall - Plastic gloves	150

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			them to use internet manufacturer manuals and library books to explore different battery faults			Circumstantial knowledge: Detailed knowledge about: • Safety precautions while maintaining batteries • Safe handling of tools and equipment • Waste disposal	• Safety boots	
		(b) Checking battery electrolyte level	Brainstorm: Guide students to brainstorm on the principles and concepts to check the battery electrolyte level. Also encourage them to use internet, manufacturer's manuals and library books to explore different battery modern methods of checking electrolyte level Practical Work:	The student should be able to: • Select tools and equipment • Remove and battery from vehicle • Service battery • Mount battery to vehicle • Read battery electrolyte level • Fill electrolytes in the battery • Observe safety precautions • Clean tools, equipment and workplace	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 Check battery electrolyte level Principles: The student should explain the principles involved in checking electrolyte level Theories: The student should explain • Steps for handling of the battery electrolyte Circumstantial knowledge: Detailed knowledge about:	The following tools, equipment and safety gears are to be available: • Vehicle • Battery charger • Battery electrolyte • Distilled or ionized water • Wire brush • Tool kit • Multimeter • Plastic container • Thermometer • Water sucker	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			Guide each student to check the battery electrolyte level Hands-on activities: Guide students in manageable groups through hands-on activities to check their electrolyte level	Store tools and equipment		Safety precautions	- Safety clear glasses - Overall - Plastic gloves - Safety boots	
		(c) Checking chemical condition of battery	Brainstorm: Guide the students to brainstorm on battery electrolyte chemical composition and chemical reactions Demonstration: Organize the students in manageable groups and demonstrate how to check chemical condition of battery Hands-on activities: Guide students in manageable groups through hands-on activities to check	The student should be able to: - Select tools and equipment - Remove and battery from vehicle - Check the specific gravity of battery electrolyte - Mount battery to vehicle - Observe safety precautions - Clean tools, equipment and work place - Store tools and equipment	Chemical condition of the battery is well checked as per technical or manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: - Use hydrometer to check the condition of battery electrolyte Principles: The student should explain the principles involved in checking battery chemical conditions Theories: The student should explain - Steps for Checking the Chemical	The following tools, equipment and safety gears are to be available: - Vehicle - Battery charger - Battery electrolyte - Distilled or ionized water - Wire brush - Tool kit - Multimeter - Plastic container - Hydrometer - Water sucker - 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	Services Assessment	Knowledge Assessment		
			the chemical condition of the battery			Condition of a Battery Circumstantial knowledge: Detailed knowledge about: Safety precautions	- Overall - Plastic gloves - Safety boots	
		(d) Checking the mechanical condition of the battery	Discussion: Guide the students in small groups to describe the construction of battery Demonstration: Organize the students in manageable groups and demonstrate how to check the mechanical condition of the battery Hands-on activities: Guide students in manageable groups through hands-on activities to check the chemical	The student should be able to: - Select tools and equipment - Remove battery from vehicle - Check battery state of charge - Inspect the battery - Connect the battery analyzer to the battery - Mount battery to vehicle - Observe safety precautions - Clean tools, equipment and work place	The mechanical condition of battery is well-checked and the battery produces the required volts per technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: - Check battery capacity Principles: The student should explain the principles involved in checking mechanical condition of battery Theories: The student should explain: - Steps for Checking the mechanical Condition of a Battery - Handling of the batteries	This element can be achieved at school workshop and the following tools, equipment and safety gear should be available: - Vehicle - Battery analyzer - Wire brush - Tool kit - Multimeter - Plastic container - Hydrometer - 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	Services Assessment	Knowledge Assessment		
			capacity of the battery	Store tools and equipment		Circumstantial knowledge: Detailed knowledge about: - Safety precautions while maintaining batteries - Safe handling of tools and equipment - Waste disposal	- Plastic gloves - Safety boots	
		(e) Performing battery charging	Think-ink-pair-share: Guide students through think-ink-pair-share to identify different battery charging arrangement Demonstration: Organize the students in manageable groups and demonstrate how to perform battery charging Hands-on activities: Guide students in manageable groups through hands-on	The student should be able to: - Select tools and equipment - Check battery state of charge - Service battery to vehicle - Test battery - Observe safety precautions - Clean tools, equipment and work place - Store tools and equipment	Charged battery produces output voltage as per technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to Perform battery charging Principles: The student should explain the principles involved in performing battery charging Theories: The student should explain: Chemical reactions taking place during charging and discharging process in	The following tools, equipment and safety gears are to be available: - Vehicle - Battery charger - Wire brush - Tool kit - Multimeter - Plastic container - Hydrometer - Water sucker - 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	Services Assessment	Knowledge Assessment		
			activities to battery charging in different arrangements			automotive batteries - Different charging methods used to charge batteries Circumstantial knowledge: Detailed knowledge about: - Safety precautions	Safety boots	
	2.2 Servicing electrical and electronic circuits	(a) Troubleshooting electrical and electronic circuits	Group discussion: Organize the students in manageable groups to discuss possible faults in electrical and electronic systems. Also encourage them to use internet manufacturers manual and library books to explore about different battery modern methods, tools and equipment for diagnosis and faulty finding Demonstration:	The student should be able to: - Select relevant safety gears, tools and equipment - Interpret electrical and electronic circuit diagrams - Use service manual - Select tools and equipment - Diagnoses electrical and electronic circuit faults	Troubleshooted electrical and electronic circuits operates as per manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: - Trace faults in electrical and electronic circuits - Interpret electrical and electronic quantities - Use service manuals Principles: The student should explain the principles involved diagnosing electrical and electronic circuits Theories: The student should explain:	The following tools, equipment and safety gears are to be available: - Vehicle - Tool kit - Multimeter - Test lamp - Service manual - Clamp on meter - Soldering gun - Work bench - Electronic diagnosis equipment/tool	120

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			Guide the student and demonstrate how to follow systematic steps in diagnosing electrical and electronics circuits Hands-on activities: Guide students in manageable groups through hands-on activities to diagnose for open circuits and short circuits	- isolate defective components - Test electrical and electronic circuit - Observe safety precautions - Clean tools, equipment and work place - Store tools and equipment		- Functions of different electrical and electronic components - Application of ohm's law - Use of electrical/electronic measuring instruments - Possible faults in electrical and electronic circuits, causes and their remedies Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacturer's service manual book	- Safety boots - Gloves - Overall	
		(b) Repairing electrical and electronic circuits	Brainstorm: Guide the students to identify possible causes of faults in electrical and electronic circuits Practical Work:	The student should be able to: - Select relevant safety gears, tools and equipment - Interpret electrical and	Repaired electrical and electronic circuits conform to manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to:	The following tools, equipment and safety gears are to be available: - Vehicle - Tool kit - Multimeter	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			Guide the student on how to use different tools and equipment for repairing electrical and electronic circuits Hands-on activities: Guide students in manageable groups through hands-on activities to repair and replace different electrical components as per manufactures manual/specifications	electronic circuit diagrams • Use service manual • Select tools and equipment • Test electrical and electronic circuit • Rectify defective components • Observe safety precautions • Clean tools, equipment and work place • Store tools and equipment		• Rectify faults in electrical and electronic circuits • Use service manuals Principles: The student should explain the principles involved in servicing and repairing electrical and electronic circuits Theories: The student should explain: • Functions of different electrical and electronic components • Use of electrical/electronic measuring instruments • Possible faults in electrical and electronic circuits, causes and their remedies Circumstantial knowledge: Detailed knowledge about: • Safety precautions	• Test lamp • Service manual • Clamp on meter • Soldering gun • Work bench • Electronic diagnosis equipment/tool • 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	Services Assessment	Knowledge Assessment		
						Manufacture's service manual book		
3.0 Maintaining starting systems	3.1 Servicing starting systems	(a) Troubleshooting starting system faults	Group discussion: Guide students to discuss and explore the concepts and principles of troubleshooting starting system faults. Also encourage them to use internet manufacturers' manuals and library books to explore different modern methods, tools and equipment for diagnosis and faulty finding Practical Work: Guide the students on how to diagnose and isolate faults of the starting system Hands-on activities: Guide students in manageable groups through hands-on	The student should be able to: - Select tools, equipment and safety gear - Check the starting system - Diagnose starting systems - Observe safety precautions - Clean tools, equipment and workplace - Store tools and equipment	Serviced starting system conforms to technical specifications or the manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to troubleshoot starting systems Principles: The student should explain the principles involved in troubleshooting starting systems Theories: The student should explain: - Electrical quantities in terms of electromotive force, voltage drop and potential difference - Operation of starting system - Application of starting system - Parts of the starting system - Possible faults, causes and their	The following tools, equipment and safety gears are to be available: - Vehicle - Electrical bench - Spanner kits - Digital/analog multi-meters - Bench light - Power supply - Clamp meter - Screwdriver set - Overcoat - Gloves - Safety glass - Safety boots	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	Services Assessment	Knowledge Assessment		
			activities to diagnose the starting system			remedies in the starting system Circumstantial knowledge: Detailed knowledge about: • Safety precautions • Manufacturer's service manual book		
		(b) Repairing starting system faults	Group discussion: Guide students to discuss the principles of repairing starting system faults Practical Work: Guide the student on how to identify and use tools and equipment for repairing starting system and store them as per technical specifications Hands-on activities: Guide students in manageable groups through hands-on activities to repair	The student should be able to: • Select tools, equipment and safety gear • Check the starting system components • Repair faults • Replace defective components • Test starting system • Observe safety precautions • Clean tools, equipment and workplace • Store tools and equipment	Repaired starting system conforms to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to repair starting systems Principles: The student should explain the principles involved in repairing beginning systems Theories: The student should explain: • Construction of starting system • Operation of starting system • Tools and equipment for repairing the starting system	The following tools, equipment and safety gears are to be available: • Vehicle • Electrical bench • Spanner kits • Digital/analog multi-meters • Bench light • Power supply • Clamp meter • Screwdriver set • Overcoat • Gloves • 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	Services Assessment	Knowledge Assessment		
			different starting system components			- Parts of the starting system - Possible faults, causes and their remedies in the starting system Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacturer's service manual book	Safety boots	
		(c) Troubleshooting pre-heating system	Think-ink-pair-share Guide students through think-ink-pair-share to describe the meaning of hard start and identify possible faults in pre-heating systems Practical Work: Guide the student on how to diagnose and isolate faults of the pre-heating system	The student should be able to: - Select tools, equipment and safety gear - Check the pre-heating system glow plugs - Diagnose pre-heating systems - Observe safety precautions - Clean tools, equipment and workplace - Store tools and equipment	Troubleshooted pre-heating system conforms to technical specifications or the manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to troubleshoot pre-heating systems Principles: The student should explain the principles involved in troubleshooting pre-heating systems Theories: The student should explain: Causes of diesel hard start	The following tools, equipment and safety gears are to be available: - Vehicle - Electrical bench - Spanner kits - Digital/analogue multi-meters - Bench light - Power supply - Clamp 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	Services Assessment	Knowledge Assessment		
			Hands-on activities: Guide students in manageable groups through hands-on activities to diagnose and test the glow plugs of the pre-heating system			• Operation of pre-heating system • Application of pre-heating system • Parts of the pre-heating system • Possible faults, causes and their remedies in the pre-heating system Circumstantial knowledge: Detailed knowledge about: • Safety precautions • Manufacturer's service manual book	• Screwdriver set • Overcoat • Gloves • Safety glass Safety boots	
		(d) Repairing pre-heating components	Group discussion: Guide students to discuss the principles and procedures of repairing pre-heating components Hands-on activities: Guide students in manageable groups	The student should be able to: • Select tools, equipment and safety gear • Check the pre-heating system components • Repair wiring faults	Repaired pre-heating system conforms to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to repair pre-heating systems Principles: The student should explain the principles involved in repairing pre-heating systems	The following tools, equipment and safety gears are to be available: • Vehicle • Electrical bench • Spanner kits • Digital/analog multi-meters	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			through hands-on activities to repair different components of the pre-heating systems	• Replace defective heater plugs • Test starting system • Observe safety precautions • Clean tools, equipment and workplace • Store tools and equipment		Theories: The student should explain: • Construction of pre-heating systems • Operation of pre-heating systems • Tools and equipment for repairing the pre-heating systems • Parts of the pre-heating systems • Possible faults, causes and their remedies in the pre-heating systems Circumstantial knowledge: Detailed knowledge about: • Safety precautions • Manufacture's service manual book	• Bench light • Power supply • Clamp meter • Screwdriver set • Overcoat • Gloves • Safety glass • Safety boots	
	3.2 Maintaining starter motors	(a) Rectifying pre-engaged starter motor	Group discussion: Guide students to discuss and explore the concepts and principles of rectifying pre-	The student should be able to: • Select tools, equipment and safety gear	Rectified pre-engaged starter motor 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: • Vehicle	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	Services Assessment	Knowledge Assessment		
			engaged starter motor Demonstration: Organize the students in manageable groups and demonstrate how to rectify pre-engaged starter motor Hands-on activities: Guide students in manageable groups through hands-on activities to repair different components of the pre-engaged starter motor	- Remove the starter from the vehicle engine - Dismantle pre-engaged starter motor - Diagnose components for defects - Rectify faulty components - Assemble the pre-engaged starter motor - Test the pre-engaged starter motor on the bench - Fix the pre-engaged starter motor to the engine - Test starter for cranking engine - Observe safety - Clean tools, equipment and workplace - Store tools and equipment		how to rectify pre-engaged starter motors Principles: The student should explain the principles involved in rectifying pre-engaged starter motor Theories: The student should explain: - Construction of pre-engaged starter motor - Functions of pre-engaged starter motor components - Starter motor operation - Magnetism properties Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacturer's service manual book	- Battery - Electrical bench - Spanner kits - Digital/analogue multi-meters - Bench light - Power supply - Clamp meter - Screwdriver set - Overcoat - Gloves - Safety glass - 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	Services Assessment	Knowledge Assessment		
		(b) Rectifying inertial starter motor	Group discussion: Guide students to discuss and explore the concepts and principles of rectifying inertial starter motor Demonstration: Organize the students in manageable groups and demonstrate how to rectify inertial starter motor Hands-on activities: Guide students in manageable groups through hands-on activities to repair different components of the inertial starter motor	The student should be able to: • Select tools, equipment and safety gear • Remove the starter from the vehicle engine • Dismantle the inertial starter motor • Diagnose components for defects • Rectify faulty components • Assemble the inertial starter motor • Test the inertial starter motor on the bench • Fix the inertial starter motor to the engine • Test starter for cranking engine • Observe safety	Rectified inertial starter motor conforms to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to rectify faults of inertial starter motors Principles: The student should explain the principles involved in rectifying inertial starter motor Theories: The student should explain: • Construction of inertial starter motor • Functions of inertial starter motor components • Starter motor operation • Magnetism properties Circumstantial knowledge: Detailed knowledge about: • Safety precautions	The following tools, equipment and safety gears are to be available: • Vehicle • Battery • Electrical bench • Spanner kits • Digital/analog multi-meters • Bench light • Power supply • Clamp meter • Screwdriver set • Overcoat • Gloves • Safety glass • 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	Services Assessment	Knowledge Assessment		
				Clean tools, equipment and workplace Store tools and equipment		Manufacture's service manual book		
		(c) Rectifying axial starter motor	Group discussion: Guide students to discuss and explore the concepts and principles of rectifying axial starter motor Demonstration: Organize the students in manageable groups and demonstrate how to rectify axial starter motor Hands-on activities: Guide students in manageable groups through hands-on activities to repair different components of the axial starter motor	The student should be able to: - Select tools, equipment and safety gear - Remove the axial starter from the vehicle engine - Dismantle the axial starter motor - Diagnose axial starter motor components for defects - Rectify the axial starter motor's faulty components - Assemble the axial starter motor - Test the axial starter motor on the bench	Rectified axial starter motor conforms to technical specifications/ manufacturer specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to rectify faults of axial starter motor Principles: The student should explain the principles of: - Removing the starter from the vehicle engine - Checking faulty axial starter motor parts - Magnetism - Assembling axial starter motor - Fitting inertial starter to engine Theories: The student should explain: - Construction of axial starter motor	The following tools, equipment and safety gears are to be available: - Vehicle - Battery - Electrical bench - Spanner kits - Digital/analog multi-meters - Bench light - Power supply - Clamp meter - Screwdriver set - Overcoat - Gloves - Safety glass - 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	Services Assessment	Knowledge Assessment		
				- Fix the axial starter motor to the engine - Test starter for cranking engine - Observe safety - Clean tools, equipment and workplace - Store tools and equipment		- Functions of axial starter motor components - axial starter motor operation Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual book		
		(d) Rectifying co-axial starter motor	Group discussion: Guide students to discuss and explore the concepts and principles of rectifying co-axial starter motor Demonstration: Organize the students in manageable groups and demonstrate how to rectify co-axial starter motor Hands-on activities: Guide students in manageable groups through hands-on	The student should be able to: - Select tools, equipment and safety gear - Remove the co-axial starter from the vehicle engine - Dismantle the co-axial starter motor - Diagnose co-axial starter motor components for defects - Rectify co-axial starter	Rectified co-axial starter motor conforms to technical specifications/ manufacturer specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to rectify faults of co-axial starter motor Principles: The student should explain the principles involved in rectifying co-axial starter motor Theories: The student should explain: Construction of co-axial starter motor	The following tools, equipment and safety gears are to be available: - Vehicle - Battery - Electrical bench - Spanner kits - Digital/analog multi-meters - Bench light - Power supply - Clamp 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	Services Assessment	Knowledge Assessment		
			activities to repair different components of the co-axial starter motor	motor faulty components - Assemble the co-axial starter motor - Test the co-axial starter motor on the bench - Fix the co-axial starter motor to the engine - Test starter for cranking engine - Observe safety - Clean tools, equipment and workplace - Store tools and equipment		- Functions of co-axial starter motor components - co-axial starter motor operation Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual book	- Screwdriver set - Overcoat - Gloves - Safety glass - Safety boots	
4.0 Carrying out general vehicle services	4.1 Servicing engine lubrication systems	(a) Changing engine oil	Discussion: Organize the students in small groups to discuss the concepts related to servicing the engine lubrication system Demonstration:	The student should be able to: - Select tools and equipment - Use service manual - Keep vehicle on level ground/hoist/service pit	The serviced engine lubrication system contains the correct type and level of engine oil according to the	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: - Check oil condition and level - Change engine oil	This element can be achieved at the school workshop and the following tools, equipment and safety gear should be available:	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	Services Assessment	Knowledge Assessment		
			Organize the students in manageable groups and demonstrate how to change engine oil and identify engine oils Hands-on activities: Guide students in manageable groups through hands-on activities to identify engine oil and change the engine oil	- Identify engine oil types and uses - Check oil level - Test engine for oil leakage - Observe safety precautions - Clean tools, equipment and work place - Store tools and equipment	manufacturer's specifications or service manual	- Check for leakage Principles: The student should explain the principles involved in changing engine oil Theories: The student should explain: - Importance of changing engine oil - Oil types according to engine fuel type Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual book	- Vehicle or stationary engine - Tool kit - Oil container (waste bin) - Funnel - Drain plug spanner (SST) - Vehicle hoist/pit - Service Manual - Air compressor - Gloves - Overall - Safety boots	
		(b) Changing engine oil filter	Brainstorm: Guide students to brainstorm on the principles and concepts to change engine oil filter Demonstration: Organize the students in manageable groups and demonstrate	The student should be able to: - Select tools and equipment - Use service manual - Keep vehicle on level ground/hoist/service pit	The serviced engine lubrication system's filter is replaced according to the manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: - Remove and refi the new filter - Check for leakage Principles: The student should explain	This element can be achieved at the school workshop and the following tools, equipment and safety gear should be available: Vehicle or stationary 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	Services Assessment	Knowledge Assessment		
			how to change the engine oil filter Hands-on activities: Guide students in manageable groups through hands-on activities to change the engine oil filter	- Locate oil filter - Remove fuel filter - Fit new filter - Inspect the engine to check oil leakage - Observe safety precautions - Clean tools, equipment and workplace - Store tools and equipment		the principles involved in changing oil filter Theories: The student should explain: - Types of oil filters - Importance of oil filter Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual book	- Oil filters - Tool kit - Oil container (waste bin) - Funnel - Drain plug spanner (SST) - Vehicle hoist/pit - Service Manual - Air compressor - Gloves - Overall - Safety boots	
	4.2 Servicing fuel systems	(a) Changing fuel filter	Discussion: Organize the students in small groups to discuss define and classify fuel filters Demonstration: Organize the students in manageable groups and demonstrate how to change fuel filter Hands-on activities: Guide	The student should be able to: - Select tools and equipment - Use the service manual - Service air cleaner - Locate fuel filters - Inspect fuel filters - Change fuel filter	The changed fuel filter conforms to the manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: Service fuel filter Principles: The student should explain the principles involved in changing the fuel filter Theories: The student should explain:	This element can be achieved at school workshop and the following tools, equipment and safety gear should be available:	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	Services Assessment	Knowledge Assessment		
			students in manageable groups through hands-on activities to change the engine fuel filter	- Inspect fuel leakages - Prime fuel system - Bleed diesel fuel system - Observe safety precautions - Clean tools, equipment and workplace - Store tools and equipment		- Function of fuel systems components - Types of fuel filters - Importance of changing fuel filter Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacturer's service manual book	- Air Compressor - Filter wrench (SST) - Fuel container - Covering blanket - Overall - Safety boots - Gloves - Safety clear glasses	
		(b) Servicing air cleaner	Think-ink-pair-share: Guide students through the think-ink-pair-share strategy to define and classify air cleaners Demonstration: Organize the students in manageable groups and demonstrate how to service air cleaners	The student should be able to: - Use service manual - Select tools and equipment - Locate air cleaners - Repair air cleaners - Replace air cleaners - Observe safety precautions	Serviced air cleaner conforms to manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: - Service air cleaner Principles: The student should explain principles involved in servicing air cleaner Theories: The student should explain: - Function of air cleaner	The following tools, equipment and safety gears are to be available: - Vehicle or stationary engine - Service manual - Tool kit - Air Compressor - Filter wrench (SST)	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			Hands-on activities: Guide students in manageable groups through hands-on activities of servicing air cleaners	- Clean tools, equipment and work place - Store tools and equipment		- Types of air cleaners - Importance of servicing air cleaners Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacturer's service manual book	The following tools, equipment and safety gears are to be available: - Fuel container - Covering blanket - Overall - Safety boots - Gloves - Safety clear glasses	
		(c) Performing fuel system bleeding	Brainstorm: Guide students to brainstorm on the principles and concepts to of perform fuel system bleeding Demonstration: Organize the students in manageable groups and demonstrate how to perform fuel system bleeding Hands-on activities: Guide students in	The student should be able to: - Select tools and equipment - Use the service manual - Prime fuel system - Bleed diesel fuel system - Test the performance of the fuel system - Observe safety precautions	The bled 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 involved in bleeding fuel systems Theories: The student should explain: - Importances of bleeding fuel system	The following tools, equipment and safety gears are to be available: - Vehicle or stationary engine - Service manual - Tool kit - Air Compressor - Fuel container - Fuel pressure 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	Services Assessment	Knowledge Assessment		
			manageable groups through hands-on activities to perform fuel bleeding	- Clean tools, equipment and workplace - Store tools and equipment		Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacturer's service manual book	- Overall - Safety boots - Gloves - Safety clear glasses	
	4.3 Servicing cooling systems	(a) Checking engine coolant	Group Discussion: Guide students to discuss and explore the concepts and principles of the cooling system. Also encourage the students to use internet to explore the modern technologies employed in cooling system Demonstration: Organize the students in manageable groups and demonstrate how to inspect for leakage in the cooling system	The student should be able to: - Use service manual - Select tools and equipment - Locate cooling system components - Check for leakages to the cooling system - Check the level of coolant - Adding coolant to the system - Observe safety precautions - Clean tools, equipment and work place	Checked coolant condition conforms to manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: - Check the level of coolant - Inspect leakages in the system - Checking engine coolant temperature sensor Principles: The student should explain the principles involved in checking engine coolant Theories: The student should explain: - Functions of cooling system and components	The following tools, equipment and safety gears are to be available: - Engine with complete cooling system - Thermometer - Tool kit - Water container - Service manual - Air compressor - Gloves - Overall - Safety boots - Safety clear glasses	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	Services Assessment	Knowledge Assessment		
			Hands-on activities: Guide students in manageable groups through hands-on activities to check the operation of engine coolant temperature sensor	Store tools and equipment		- Types of cooling systems and components - Causes of engine overheating/under cooling - Sensors involved in monitoring engine temperature and coolant temperature (coolant temperature sensors) Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacturer's service manual book		
		(b) Replacing fan belt	Demonstration: Organize the students in manageable groups and demonstrate how to replace fan belt Hands-on activities: Guide	The student should be able to: - Select tools and equipment - Use the service manual - Locate fan belt - Diagnose fan belt and pulley	Fan belt is replaced as per the manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: - Diagnose fan belt - Remove and refit fan belt	This element can be achieved at school workshop and the following tools, equipment and safety gear should 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	Services Assessment	Knowledge Assessment		
			students in manageable groups through hands-on activities to replace the fan belt	- Remove the defective belt - Fit new fan belt - Adjust fan belts - Observe safety precautions - Clean tools, equipment and workplace - Store tools and equipment		- Adjust fan belts Principles: The student should explain the principles involved in replacing fan belt Theories: The student should explain: - Functions of fan belt - Fan belt faults and their possible causes and remedies Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacturer's service manual book	- Engine with complete cooling system - Tool kit - Fan belts - Service manual - Gloves - Overall - Safety boots - Safety clear glasses	
		(c) Checking the operation of the thermostat	Think-ink-pair-share: Guide students through think-ink-pair-share to define and explain the operation of the thermostat Demonstration:	The student should be able to: - Select tools and equipment - Use the service manual - Locate the thermostat - Remove the thermostat	Checked thermostat functions according to manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: Check the thermostat Principles: The student should explain the principles involved	This element can be achieved at school workshop and the following tools, equipment and safety gears should be available	Engine with complete

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			Organize the students in manageable groups and demonstrate how to check the operation of the thermostat Hands-on activities: Guide students in manageable groups through hands-on activities to check the operation of thermostat	from the cooling system - Inspect the thermostat - Check the operation of the thermostat - Refit the thermostat - Test cooling system performance - Observe safety precautions - Clean tools, equipment and workplace - Store tools and equipment		in checking the operation of the thermostat Theories: The student should explain: - Characteristic and function of thermostat - Construction and operation of thermostat - Faults of the thermostat their causes and remedies Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual book	cooling system - Thermostat - Thermometer - Tool kit - Water container - Service manual - Electric cooker/water heater - Gloves - Overall - Safety boots - Safety clear glasses	
		(d) Servicing radiator	Demonstration: Organize the students in manageable groups and demonstrate how to diagnose different components of radiator	The student should be able to: - Select tools and equipment - Use the service manual - Locate the radiator	Serviced radiator functions according to the manufacturer's service manual books	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: Service radiator cap	This element can be achieved at school workshop and the following tools, equipment and safety gear should 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	Services Assessment	Knowledge Assessment		
			Hands-on activities: Guide students in manageable groups through hands-on activities to service the radiator	• Insect components of radiator • Check for coolant leakage • Repair or replace defective radiator parts • Test cooling system performance • Observe safety precautions • Clean tools, equipment and workplace • Store tools and equipment		Principles: The student should explain the principles involved in Servicing radiator Theories: The student should explain: • Functions of radiator • Possible radiator faults and their causes and remedies Circumstantial knowledge: Detailed knowledge about: • Safety precautions • Manufacture’s service manual book	• Engine with complete cooling system • Thermometer • Tool kit • Water container • Service manual • Gloves • Overall • Safety boots • Safety clear glasses	
		(e) Servicing water pump	Demonstration: Organize the students in manageable groups and demonstrate how to diagnose different components of water pump Hands-on activities: Guide students in	The student should be able to: • Select tools and equipment • Use the service manual • Locate the water pump • Diagnose the water pump	Serviced water pump functions according to the manufacturer’s specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: • service water pump Principles: The student should explain the principles involved	This element can be achieved at school workshop and the following tools, equipment and safety gear should be available • Engine with complete cooling 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	Services Assessment	Knowledge Assessment		
			manageable groups through hands-on activities to service the water pump	- Repair water pump - Test cooling system performance - Observe safety precautions - Clean tools, equipment and workplace - Store tools and equipment		in servicing water pump Theories: The student should explain: - Functions of water pump - Types of water pumps - Possible faults of water pump the causes and remedies Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacturer's service manual book	- Tool kit - Water container - Service manual - Gloves - Overall - Safety boots - Safety clear glasses	
	4.4 Servicing transmission systems	(a) Checking clutch free play	Group Discussion: Guide students in groups to collaborative define the concepts related to transmission system Demonstration: Organize the students in	The student should be able to: - Select tools and equipment - Use service manual - Locate the clutch - Adjust clutch free play - Observe safety precautions	Serviced clutch conforms to manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: Adjust clutch free play Principles: The student should explain the principles involved in servicing	This element can be achieved at school workshop and the following tools, equipment and safety gears should be available - Vehicle - Service manual - Tool kit	60

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			manageable groups and demonstrate how to check clutch free play Practical Work: Provide students with hands-on activities to practice for checking clutch free play	• Clean tools, equipment and workplace • Store tools, equipment and parts		transmission systems Theories: The student should explain: • Functions of transmission system components • Types of transmission system • Importance of adjusting clutch free play Circumstantial knowledge: Detailed knowledge about: • Safety precautions • Manufacturer's service manual book	• Service pit/vehicle hoist • Overall • Gloves • Safety boots • Safety clear glasses	
		(b) Servicing gear box	Brainstorm: Guide the students to define gear box Identify the functions of gear box Describe the importance of servicing gear box Practical Work:	The student should be able to: • Use the service manual • Select tools and equipment • Diagnose gear box components	Serviced gear box conforms to manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: • Inspect the gear box • Service the gear box	This element can be achieved at school workshop and the following tools, equipment and safety gears should be available • Vehicle • 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	Services Assessment	Knowledge Assessment		
			Guide the student on how to prepare tools and equipment for servicing gear box Hands-on activities: Guide students in manageable groups through hands-on activities to service gear box	- Repair the fault components - Perform lubrication of gearbox parts - Observe safety precautions - Clean tools, equipment and work place - Store tools, equipment and parts		Principles: The student should explain the principles involved in servicing gear boxes Theories: The student should explain: - Functions of gearbox - Types of gearboxes - Importance of servicing gearbox Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacturer's service manual book	- Tool kit - Oil container with supply pipe and pump - Drain plug spanner (SST) - Service pit/vehicle hoist - Overall - Gloves - Safety boots - Safety clear glasses	
		(c) Servicing propeller shaft	Demonstration: Organize the students in manageable groups and demonstrate how to service propeller shaft Practical Work: Provide students with hands-on activities to	The student should be able to: - Select tools and equipment - Use service manual - Locate the propeller shaft - Inspect the cross joints	Serviced propeller shaft conforms to the manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to Service propeller shaft Principles: The student should explain the principles involved in servicing propeller shaft	This element can be achieved at school workshop and the following tools, equipment and safety gears should 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	Services Assessment	Knowledge Assessment		
			practice servicing the propeller shaft Hands-on activities: Guide students in manageable groups through hands-on activities to service the propeller shaft	- Grease the propeller cross joints - Observe safety precautions - Clean tools, equipment and workplace - Store tools, equipment and parts		Theories: The student should explain: - Functions of propeller shaft - Importances of servicing the propeller shaft - Use of service manual Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacturer's service manual book	- Oil container with supply pipe and pump - Drain plug spanner (SST) - Service pit/vehicle hoist - Overall - Gloves - Safety boots - Safety clear glasses	
	4.5 Performing greasing	(a) Carrying out chassis greasing	Group Discussion: Guide students in groups to collaboratively explain the concepts related to greasing and identify the importance of chassis greasing shaft Demonstration:	The student should be able to: - Select tools and equipment - Inspect and clean the chassis components to be greased - Lubricate chassis joints/parts - Observe safety precautions	Greased chassis parts conform to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to perform greasing Principles: The student should explain the principles involved in greasing Theories: The student should explain:	This element can be achieved at school workshop and the following tools, equipment and safety gears should be available - Vehicle - Grease gun/grease pump - Tool kit	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	Services Assessment	Knowledge Assessment		
			Organize the students in manageable groups and demonstrate how to grease chassis parts and joints Hands-on activities: Guide students in manageable groups through hands-on activities to grease chassis parts and joints	- Clean tools, equipment and workplace - Store tools and equipment		- Types of grease and their use - The importance of greasing chassis and body parts Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual book	- Wheel blocks - Floor jack - Safety stands - Gloves - Overall - Safety boots - Safety clear glasses	
		(b) Lubricating door locks and hinges	Brainstorm: Guide the students to Explain the meaning of greasing Identify the importance of door locks and hinges Demonstration: Organize the students in manageable groups and demonstrate how to identify and locate different	The student should be able to: - Select tools and equipment - Inspect and clean the door locks and hinges to be greased - Lubricate chassis joints/ parts - Observe safety precautions - Clean tools, equipment and workplace	Greased door locks and hinges conform to manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: - Clean clogged nipples - Lubricate door hinges Principles: The student should explain the principles involved in lubricating door locks and hinges Theories: The student should explain:	This element can be achieved at school workshop and the following tools, equipment and safety gears should be available - Vehicle - Grease gun/grease pump - Tool kit - Wheel blocks - Floor jack - Safety stands	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			door locks and hinges to be greased Hands-on activities: Guide students in manageable groups through hands-on activities to grease door locks and hinges	Store tools and equipment		- The importance of greasing door locks and hinges Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacturer's service manual book	- Gloves - Overall - Safety boots - Safety clear glasses	
5.0 Maintaining the lighting system	5.1 Repairing headlight systems	(a) Performing head light aiming	Group Discussion: Guide students in groups to collaboratively describe the concepts related to headlight and the principles of headlight aiming Demonstration: Organize the students in manageable groups and demonstrate how to perform headlight aiming using the plain colored wall Hands-on activities: Guide	The student should be able to: - Select tools, equipment and safety gears - Prepare the plain wall for headlight aiming - Set the beam settler to perform headlight aiming - Test the aimed head light systems - Observe safety precautions - Clean tools and equipment	Aimed head light system conforms to manufacturer's instructions	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to Perform head light aiming Principles: The student should explain the principles involved in performing head light aiming Theories: The student should explain: - Construction - Operation of head lights - Application of head light systems	The following tools, equipment and safety gears are to be available: - Vehicle - Set of tools - Head light beam setter - Digital and analogue multi-meters - Clamp meter - Overcoat - Safety boots - Safety glass - Gloves	52

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			students in manageable groups through hands-on activities to perform headlight aiming by using the beam setter	Store tools and equipment		- Types of head light beams - Types of head light systems - Types of head light bulbs - Adjustment procedure of head lights Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacturer's service manual book		
		(b) Troubleshooting head light system	Think-ink-pair-share: Guide students through think-ink-pair-share to explore common faults of headlight systems, Demonstration: Organize the students in manageable groups and demonstrate how to	The student should be able to: - Select tools, equipment and safety gear - Interpret headlight circuits - Diagnose head light systems - Observe safety precautions - Clean tools and equipment	Troubleshoot head light system conforms to manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to troubleshoot head light systems Principles: The student should explain the principles involved in troubleshooting head light system Theories: The student should explain:	The following tools, equipment and safety gears are to be available: - Vehicle - Set of tools - Head light beam setter - Digital and analogue multi-meters - Clamp meter - Overcoat	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			troubleshoot head light system Hands-on activities: Guide students in manageable groups through hands-on activities to diagnose, repair and replace different headlight components	Store tools and equipment		- Construction of head lights - Operation of head lights - Application of head light systems - Types of head light systems - Types of head light bulbs - Troubleshooting procedure of head lights Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual book	- Safety boots - Safety glass - Gloves	
		(c) Repairing head lights components	Brainstorm: Guide students to brainstorm on the principles and concepts to repair head lights components Practical Work: Provide students with hands-on activities to	The student should be able to: - Select tools, equipment and safety gear - Interpret and locate light circuits - Test head light components	Troubleshoot head light system conforms to manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to repair head light systems Principles: The student should explain the principles involved	The following tools, equipment and safety gears are to be available: - Vehicle - Set of tools - Head light beam setter	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			practice identify and locate faulty components of head light system Hands-on activities: Guide students in manageable groups through hands-on activities to test, repair and replace different headlight components	- Rectify head light system faults - Repair or replace defective components - Test head light systems - Observe safety precautions - Clean tools and equipment - Store tools and equipment		in Repairing head lights components Theories: The student should explain: - Operation of head lights - Application of head light systems - Types of head light systems - Types of head light bulbs - Procedure for repairing head lights Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual book	- Digital and analogue multi-meters - Clamp meter - Overcoat - Safety boots - Safety glass - Gloves	
	5.2 Repairing turn signals and hazard lights	(a) Checking turn signals	Group Discussion: Guide students in groups to collaboratively identify common faults, causes and remedies turn signals	The student should be able to: - Select tools, equipment and safety gear - Interpret turn signal circuits	Repaired turn signals conform to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to check turn signals Principles: The student should explain	The following tools, equipment and safety gears are to be available: Vehicle Tool kit	52

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			Practical Work: Provide students with hands-on activities to practice for troubleshooting turn signals Hands-on activities: Guide students in manageable groups through hands-on activities to: Organize the students in manageable groups to check and repair different faulty components of turn signals	• Troubleshoot turn signal circuit faults • Rectify turn signal faults • Test turn signals lights • Observe safety precautions • Clean tools and equipment • Store tools and equipment		the principles involved in servicing turn signals Theories: The student should explain: • Types of turn light systems • Diagnosis of turn signals • Types of flasher relays Circumstantial knowledge: Detailed knowledge about: • Safety precautions • Manufacture's service manual book	• Digital and analogue multi-meters • Test lamp • Overcoat • Safety boots • Gloves • Safety glass	
		(b) Checking hazard lights	Think-ink-pair-share: Guide students through think-ink-pair-share to identify common faults, causes and remedies hazard lights Demonstration:	The student should be able to: • Interpret hazard lights circuits • Select tools, equipment and safety gears • Troubleshoot hazard lights circuit faults	Repaired hazard lights conform to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to check hazard lights Principles: The student should explain the principles involved	The following tools, equipment and safety gears are to be available: • Vehicle Tool kit • Digital and analogue multi-meters • Test lamp • Overcoat	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			Guide the student to demonstrate how to use different tools and equipment for troubleshooting hazard lights Hands-on activities: Guide students in manageable groups through hands-on activities to check and repair different faulty components of hazard lights	- Rectify turn signal faults - Test hazard lights - Observe safety precautions - Clean tools and equipment - Store tools and equipment		in Servicing hazard lights Theories: The student should explain: - Diagnosis of hazard lights - Types of flasher relays Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual book	Safety boots Gloves Safety glass	
	5.3 Servicing parking lights	(a) Rectifying light combined switch and relays	Group Discussion: Guide students in groups to collaboratively identify common faults, causes and remedies combined switch and relays Demonstration: Organize the students in manageable groups and demonstrate how to rectify light	The student should be able to: - Select tools, equipment and safety gear - Interpret Park light circuits - Diagnose system fault combined switch and relays - Rectify fault combined switch and relays	Serviced combined switch and relays function according to manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should describe how to service combined switch and relays Principles: The student should explain the principles involved in servicing parking combined switch and relays	The following tools, equipment and safety gears are to be available: - Vehicle Tool kit - Digital and analogue multi-meters - Test lamp - Overcoat - Safety boots - Gloves - Safety glass	53

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			combined switch and relays Hands-on activities: Guide students in manageable groups through hands-on activities to check and repair different faulty combined switch and relays	• Test the combined switch and relays • Observe safety • Clean tools and equipment • Store tools and equipment		Theories: The student should explain: • Application combined switch and relays • Faults in combined switch and relays, causes and remedies Circumstantial knowledge: Detailed knowledge about: • Safety precautions • Manufacture's service manual book		
		(b) Replacing defective side lamps and bulbs	Brainstorm: Guide the students to identify common faults, causes and remedies side lamps and bulbs Demonstration: Organize the students in manageable groups and demonstrate how to replace defective side lamps and bulbs	The student should be able to: • Select tools, equipment and safety gear • Interpret Park light circuits • Diagnose system fault side lamps and bulbs • Rectify faulty side lamps and bulbs	Serviced side lamps and bulbs function according to the manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to replace defective side lamps and bulbs Principles: The student should explain the principles involved in servicing side lamps and bulbs • Testing side lamps and bulbs	This element can be achieved at school workshop and the following tools, equipment and safety gear should be available: • Vehicle Tool kit • Digital and analogue multi-meters • Test lamp • Overcoat	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			Hands-on activities: Guide students in manageable groups through hands-on activities to check and repair different faulty side lamps and bulbs	• Test the side lamps and bulbs • Observe safety • Clean tools and equipment • Store tools and equipment		Theories: The student should explain: • Application of side lamps and bulbs • Faults in side lamps and bulbs, causes and remedies Circumstantial knowledge: Detailed knowledge about: • Safety precautions • Manufacture's service manual book	Safety boots Gloves Safety glass	
	5.4 Servicing brake light systems	(a) Checking brake lights	Group Discussion: Guide students in groups to collaboratively identify common faults, causes and remedies of brake lights Demonstration: Guide the student to demonstrate how to identify faults of brake light system	The student should be able to: • Select tools, equipment and safety gear • Interpret circuit diagrams • Diagnose faults in the brake lights • Rectify brake lights faulty • Test brake lights	Serviced brake lights according to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to service brake lights Principles: The student should explain the principles involved in Servicing brake lights Theories: The student should explain:	The following tools, equipment and safety gears are to be available: • Vehicle Tool kit • Digital and analogue multi-meters • Test lamp • Overcoat • Safety boots • Gloves • Safety glass	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	Services Assessment	Knowledge Assessment		
			Hands-on activities: Guide students in manageable groups through hands-on activities to check and repair different faulty brake lights	- Observe safety - Clean tools and equipment - Store tools and equipment		- Types of brake lights - Functions of brake lights - Parts of brake lights Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual book		
		(b) Troubleshooting brake light circuit	Think-ink-pair-share: Guide students through think-ink-pair-share to identify common faults, causes and remedies for brake light system Demonstration: Organize the students in manageable groups and demonstrate how to Troubleshooting brake light circuit	The student should be able to: - Select tools, equipment and safety gear - Interpret brake light circuit diagram - Diagnose faults in the brake light system - Rectify brake light components and replace faulty components	Serviced brake light circuit functions according to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to service brake light system Principles: The student should explain the principles involved in Servicing brake light circuit Theories: The student should explain: - Types of brake light bulbs - Functions of brake lights	The following tools, equipment and safety gears are to be available: Vehicle Tool kit - Digital and analogue multi-meters - Test lamp - Overcoat - Safety boots - Gloves - 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	Services Assessment	Knowledge Assessment		
			Hands-on activities: Guide students in manageable groups through hands-on activities to check and repair different faulty brake light system	• Test brake light system • Observe safety • Clean tools and equipment • Store tools and equipment		• Components of brake light circuit Circumstantial knowledge: Detailed knowledge about: • Safety precautions • Manufacture's service manual book		
6.0 Repairing hydraulic brake system	6.1 Servicing hydraulic brake system components	(a) Servicing master cylinder	Group Discussion: Guide students in groups to collaboratively explain the concepts related to hydraulic brake system and master cylinders Demonstration: Organize the students in manageable groups and demonstrate how to diagnose faults of the master cylinder Hands-on activities: Guide students in manageable groups	The student should be able to: • Select tools and equipment • Use service manual • Diagnose master cylinder • Rectify fault master cylinder • Repair or replace fault master cylinder components • Test master cylinder • Observe safety precautions	Serviced master cylinder functions according to manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to diagnose and repair or replace master cylinder Principles: The student should explain the principles involved in Servicing master cylinder Theories: The student should explain: • Function of hydraulic brake system • Construction and operation of brake master cylinder	The following tools, equipment and safety gears are to be available: • Vehicle with hydraulic brake system • Service manual • Tool kit • Work bench • Bench vice • Gloves • Overall • Safety boots • Safety clear glass	36

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			through hands-on activities to service brake master cylinder	- Clean tools, equipment and work place - Store tools and equipment		- Classification of brake fluids Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual book		
		(b) Servicing wheel cylinder	Think-ink-pair-share: Guide students through think-ink-pair-share to identify types, construction and operation of wheel cylinders Demonstration: Organize the students in manageable groups and demonstrate how to diagnose faults in the wheel cylinder Hands-on activities: Guide students in manageable groups through hands-on	The student should be able to: - Use service manual - Select tools and equipment - Diagnose wheel cylinder - Rectify fault wheel cylinder - Repair or replace faulty wheel cylinder components - Test wheel cylinder - Observe safety precautions - Clean tools, equipment and work place	Serviced wheel cylinder functions according to manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to service wheel cylinder Principles: The student should explain the principles involved in servicing wheel cylinder Theories: The student should explain: - Construction and operation of brake wheel cylinder - Operation of a Brake Wheel Cylinder	The following tools, equipment and safety gears are to be available: - Vehicle with hydraulic brake system - Service manual - Tool kit - Work bench - Bench vice - 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	Services Assessment	Knowledge Assessment		
			activities to service brake wheel cylinder	Store tools and equipment		- Steps for Servicing the Wheel Cylinder Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual book		
		(c) Servicing brake booster	Brainstorm: Guide the students brainstorm on booster. Demonstration: Organize the students in manageable groups and demonstrate how to diagnose faults of the brake booster Hands-on activities: Guide students in manageable groups through hands-on activities to service brake booster, Encourage them to use internet and	The student should be able to: - Use service manual - Select tools and equipment - Diagnose brake booster - Rectify fault brake booster - Repair or replace fault brake booster components - Test brake booster - Observe safety precautions - Clean tools, equipment and work place	Serviced brake booster functions according to manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: - Diagnose and repair or replace brake booster Principles: The student should explain the principles involved in servicing brake booster Theories: The student should explain: - Construction and operation of electric brake booster and its electronic systems	The following tools, equipment and safety gears are to be available: - Vehicle with hydraulic brake system - Service manual - Tool kit - Work bench - Bench vice - 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	Services Assessment	Knowledge Assessment		
			explore about modern technologies used in brake boosters	Store tools and equipment		- Rectifying procedures of electric brake booster and its electronic systems Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual book		
		(d) Performing bleeding hydraulic brake system	Think-ink-pair-share: Guide students through think-ink-pair-share to define air bleeding Demonstration: Organize the students in manageable groups and demonstrate how to prepare the vehicle for air bleeding Hands-on activities: Guide students in manageable groups	The student should be able to: - Use service manual - Select tools and equipment - Perform bleeding - Observe safety precautions - Clean tools, equipment and work place - Store tools and equipment	The bled braking system functions according to manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: - Bleed brake system - Test brakes Principles: The student should explain the principles involved in bleeding hydraulic brake system Theories: The student should explain: - Effect of air in hydraulic system	The following tools, equipment and safety gears are to be available: - Vehicle with hydraulic brake system - Service manual - Tool kit - Work bench - Bleeding container and transparent pipe - Pressure hydraulic brake bleeder	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			through hands-on activities to perform air bleeding to the hydraulic brake system			- Types of brake fluid - Importance of bleeding brake system Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual book	- Long nose pliers - Gloves - Overall - Safety boots - Safety clear glass	
	6.2 Servicing drum brake	(a) Checking brake drum	Group Discussion: Guide students in groups to collaboratively identify possible faults of the brake drum Demonstration: Organize the students in manageable groups and demonstrate how to diagnose the brake drum Hands-on activities: Guide students in manageable groups	The student should be able to: - Use service manual - Select tools and equipment - Dismantle drum brakes - Inspect drum brake components - Service drum brake components - Observe safety precautions - Clean tools, equipment and work place	Checked drum brake conforms to manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: - Clean drum brake components - Inspect brake drum Principles: The student should explain the principles involved in checking brake drum Theories: The student should explain: - Function of drum brakes	The following tools, equipment and safety gears are to be available: - Vehicle with drum brakes - Jack - Wheel blocks - Tool kit - Service manual - Hoist or service pit - Safety stands - Wire brush	34

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			through hands-on activities to repair faults of brake drum	Store tools and equipment		- Causes of drum brake failures and their remedies Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual book	- Wheel spanner - G/Clamps - Masks, - Goggles - Overall - Safety boots - Safety clear glasses	
		(b) Relining drum braking shoes	Think-ink-pair-share: Guide students through think-ink-pair-share to identify the importance of relining brake shoes Demonstration: Organize the students in manageable groups and demonstrate how to diagnose brake shoe to determine if they should be relined or not Hands-on activities: Guide	The student should be able to: - Use service manual - Select tools and equipment - Dismantle drum brakes - Inspect brake shoes - Service brake shoe components - Observe safety precautions - Clean tools, equipment and work place - Store tools and equipment	Relined brake shoes conform to manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: - Reline brake shoes Principles: The student should explain the principles involved in relining drum Theories: The student should explain: - Types of materials used to reline brake shoes - Procedures for relining drum	The following tools, equipment and safety gears are to be available: - Vehicle with drum brakes - Jack - Wheel blocks - Tool kit - Service manual - Hoist or service pit - Safety stands - Wire brush - Wheel spanner - 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	Services Assessment	Knowledge Assessment		
			students in manageable groups through hands-on activities of relining brake shoes			Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual book	- Masks, - Goggles - Overall - Safety boots - Safety clear glasses	
		(c) Adjusting brakes	Brainstorm: Guide students to brainstorm on the principles and concepts to Adjust brakes Demonstration: Organize the students in manageable groups and demonstrate how to prepare tools equipment and working area for performing brake adjustment Hands-on activities: Guide students in manageable groups through hands-on activities to adjust the drum brake	The student should be able to: - Select tools and equipment - Use service manual - Dismantle drum brakes - Inspect drum brake components - Locate the brake adjuster components - Observe safety precautions - Clean tools, equipment and work place - Store tools and equipment	Adjusted brake conforms to manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to adjust brakes Principles: The student should explain the principles involved in adjusting drum brakes Theories: The student should explain: - Benefit of adjusting brakes - Causes of drum brake failures and their remedies Circumstantial knowledge: Detailed knowledge about: - Safety precautions	The following tools, equipment and safety gears are to be available: - Vehicle with drum brakes - Jack - Wheel blocks - Tool kit - Service manual - Hoist or service pit - Safety stands - Wire brush - Wheel spanner - G/Clamps - Masks, - Goggles - 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	Services Assessment	Knowledge Assessment		
			with aid of service manual			Manufacture's service manual book	- Safety boots - Safety clear glasses	
		(d) Performing facing of brake drums	Brainstorm: Guide the students to brainstorm on the importance of facing brake shoes Demonstration: Organize the students in manageable groups and demonstrate how to determine if they should be faced or not Hands-on activities: Guide students in manageable groups through hands-on activities to perform facing of brake drums	The student should be able to: - Select tools and equipment - Use service manual - Dismantle drum brakes - Inspect drum brake and its components - Service drum - Observe safety precautions - Clean tools, equipment and work place - Store tools and equipment	faced drum brake conforms to the manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to perform facing of brake drums Principles: The student should explain the principles involved in performing facing of brake drums Theories: The student should explain: - Importance of facing the brake drum - Causes of drum brake failures and their remedies Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual book	The following tools, equipment and safety gears are to be available: - Vehicle with drum brakes - Jack - Wheel blocks - Tool kit - Service manual - Hoist or service pit - Safety stands - Wire brush - Wheel spanner - G/Clamps - Masks, - Goggles - 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	Services Assessment	Knowledge Assessment		
	6.3 Servicing disc brakes	(a) Replacing brake pads	Group Discussion: Guide students in groups to collaboratively describe disc brake construction and compare it to the drum brakes, Demonstration: Organize the students in manageable groups and demonstrate how to replace brake pads Hands-on activities: Guide students in manageable groups through hands-on activities to replace brake pads	The student should be able to: • Select tools and equipment • Use service manual • Inspect the brake pads • Check brake pad wear indicator and disc • Test brakes • Observe safety precautions • Clean tools, equipment and work place • Store tools and equipment	Serviced disc brakes conform to manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to replace brake pads Principles: The student should explain the principles involved in replacing brake pads Theories: The student should explain: • Components of disc brakes • Advantages of disc brakes as compared to drum brakes • Materials used for brake pads • Embedded electronic system working together with brake pads • Causes of disc brake failures and their remedies Circumstantial knowledge:	The following tools, equipment and safety gears are to be available: • Vehicle with disc brakes • Service manual • Tool kit • Wheel spanner • Jack • Wheel blocks • Air compressor • Bleeding equipment/tools • Service pit/hoist • Safety stands • Overall • Safety boots • Gloves • Safety clear glasses	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	Services Assessment	Knowledge Assessment		
						Detailed knowledge about: • Safety precautions • Manufacture's service manual book		
		(b) Repairing brake caliper	Think-ink-pair-share: Guide students through think-ink-pair-share to describe the disc brake caliper Demonstration: Organize the students in manageable groups and demonstrate how to repair brake caliper Hands-on activities: Guide students in manageable groups through hands-on activities to repair the faults caliper	The student should be able to: • Select tools and equipment • Use service manual • Inspect the disc brake caliper • Check brake disc brake caliper • Bleed brakes • Test brakes • Observe safety precautions • Clean tools, equipment and work place • Store tools and equipment	The repaired brake caliper conforms to manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to repair brake caliper Principles: The student should explain the principles involved in repairing brake caliper Theories: The student should explain: • Advantages of disc brakes as compared to drum brakes • Causes of disc brake calipers failures and their remedies Circumstantial knowledge:	The following tools, equipment and safety gears are to be available: • Vehicle with disc brakes • Service manual • Tool kit • Wheel spanner • Jack • Wheel blocks • Air compressor • Bleeding equipment/tools • Service pit/hoist • Safety stands • 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	Services Assessment	Knowledge Assessment		
						Detailed knowledge about: - Safety precautions - Manufacture's service manual book	- Gloves - Safety clear glasses	
		(c) Performing facing of disc	Brainstorm: Guide the students to brainstorm on the importance of facing brake disc Demonstration: Organize the students in manageable groups and demonstrate how to perform facing of disc Hands-on activities: Guide students in manageable groups through hands-on activities to perform facing brake disc	The student should be able to: - Select tools and equipment - Use service manual - Inspect brake disc - Observe safety precautions - Clean tools, equipment and workplace - Store tools and equipment	Faced disc brakes conform to the manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to face the brake disc Principles: The student should explain the principles involved in facing brake disc Theories: The student should explain - Advantages of brake disc facing - Causes of disc brake failures and their remedies Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual book	The following tools, equipment and safety gears are to be available: - Vehicle with disc brakes - Service manual - Tool kit - Wheel spanner - Jack - Wheel blocks - Air compressor - Bleeding equipment/tools - Service pit/hoist - Safety stands - 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	Services Assessment	Knowledge Assessment		
							• Gloves • Safety clear glasses	

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	Services Assessment	Underpinning Knowledge		
1.0 Maintaining suspension system	1.1 Replacing suspension bushes	(a) Replacing spring bushes	Brainstorm: Guide the students to define the terms related to the suspension system Classify suspension system Explain the functions of the suspension system Also, encourage them to use internet manufacturers' manuals and library books to explore different modern technologies in automotive suspension system Practical Work: Guide the student on how to use tools and equipment to locate	The student should be able to: - Select tools, equipment and safety gear - Identify and locate defective spring brushes - Inspect spring bushes - Replace faulty rubber/brass/steel brushes - Observe safety precautions - Clean, tools, equipment and work place - Store tools and equipment	Spring bushes replaced as per manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: - Inspect spring bushes - Replace spring bushes Principles: The student should explain the principles involved in replacing spring bushes Theories: The student should explain: - Meaning of suspension system - Construction of suspension system - Function of suspension systems	The following tools, equipment and safety gears are to be available: - Vehicle - Tool kit - Jack - Stop blocks/wedges - Wire brush - Tyre lever - Wheel spanner - Set of pullers - Safety boot - Gloves - Safety stand - Helmet - Overall	54

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
			and identify faulty spring bushes as per technical specifications Hands-on activities: Guide students in manageable groups through hands-on activities to replace faulty spring bushes			- The difference between rubber and steel bushes - Types of suspension systems Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual book	Safety clear glasses	
		(b) Replacing stabilizer bushes	Demonstration: Organize the students in manageable groups and demonstrate how to identify faulty stabilizer bushes Practical Work: Guide the student on how to use tools and equipment to locate and identify and locate faulty stabilizer bushes as	The student should be able to: - Select tools, equipment and safety gear - Identify and locate defective spring brushes - Inspect stabilizer bushes - Replace faulty rubber/brass/steel brushes - Observe safety precautions	Stabilizer bushes are replaced as per manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to replace stabilizer bushes Principles: The student should explain the principles involved in replacing stabilizer bushes Theories: The student should explain:	The following tools, equipment and safety gears are to be available: - Vehicle - Tool kit - Jack - Stop blocks/wedges - Wire brush - Tyre lever - 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	Services Assessment	Underpinning Knowledge		
			per technical specifications Hands-on activities: Guide students in manageable groups through hands-on activities to replace faulty stabilizer bushes	- Clean, tools, equipment and work place - Store tools and equipment		- Procedures for replacing stabilizer bushes - The difference between rubber and steel bushes Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual book	- Set of pullers - Safety boot - Gloves - Safety stand - Helmet - Overall - Safety clear glasses	
	1.2 Replacing suspension shock absorbers	(a) Replacing telescopic shock absorber	Brainstorm: brainstorm on the concepts and principles of replacing telescopic shock absorbers Describe the construction of telescopic shock absorbers Also encourage students to use internet, manufacturers'	The student should be able to: - Select tools, equipment and safety gear - Identify and locate defective telescopic shock absorber - Inspect telescopic shock absorber	Shock absorbers are replaced as per manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: - Check telescopic shock absorber condition - Replace telescopic shock absorber Principles: The student should explain the principles involved in	The following tools, equipment and safety gears are to be available: - Tool kit - Jack - Vehicle with shock absorber - Safety stand - Stop blocks/wedges	54

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
			manuals and library books to explore more information Practical Work: Guide the student on how to identify and use tools and equipment for replacing telescopic shock absorber Hands-on activities: Guide students in manageable groups through hands-on activities to replace telescopic shock absorbers	- Replace faulty telescopic shock absorber - Observe safety precautions - Clean, tools, equipment and work place - Store tools and equipment		replacing telescopic shock absorber Theories: The student should explain: - Purpose of shock absorber - Types of shock absorbers - Importance of replacing defective telescopic shock absorber Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual book	- Wire brush - Mallet/rubber hammer - Ruler - Round punch - Safety boots - Overalls - Gloves - Safety clear glass - Helmet	
		(b) Replacing McPherson strut shock absorber	Brainstorm: Guide the students to Identify the difference between telescopic shock absorber and McPherson strut shock absorber	The student should be able to: - Select tools, equipment and safety gear - Identify and locate defective McPherson strut	McPherson strut shock absorber replaced as per manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: Check McPherson strut condition	The following tools, equipment and safety gears are to be available: - Tool kit - 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	Services Assessment	Underpinning Knowledge		
			Also encourage them to use internet manufacturers' manuals and library books to explore more information Demonstration: Organize the students in manageable groups and demonstrate how to identify, use, clean and store different tools and equipment used in replacing shock absorbers Hands-on activities: Guide students in manageable groups through hands-on activities to replace telescopic shock absorber	- Inspect McPherson strut - Replace faulty McPherson strut - Observe safety precautions - Clean, tools, equipment and work place - Store tools and equipment		- Replace McPherson strut Principles: The student should explain the principles involved in replacing McPherson strut shock absorber Theories: The student should explain: - Steps for McPherson strut shock absorber - Importance of replacing defective McPherson strut Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual	- 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	
	1.3 Replacing steel suspension springs	(a) Replacing coil springs	Brainstorm: Guide the students to Explain the meaning of steel springs	The student should be able to: Use service manual	Coil spring are replaced as per	Knowledge evidence: Detailed knowledge of: Method used: The student should explain	The following tools, equipment and safety gears	60

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
			Identify types of steel springs Also encourage them to use internet manufacturers' manuals and library books to explore different modern technologies of automotive springs Practical Work: Guide the student on how to identify and use tools and equipment for replacing faulty coil springs and store them as per technical specifications Hands-on activities: Guide students in manageable groups through hands-on activities to replace coil springs	- Select tools, equipment and safety gear - Identify and locate coil springs - Inspect the coil spring and to identify faults - Replace coil spring - Test coil spring performance - Observe safety precautions - Clean, tools, equipment and work place - Store tools and equipment	technical specifications	how to replace coil springs Principles: The student should explain the principles involved in replacing coil springs Theories: The student should explain: - Function of suspension steel springs - Types of suspension steel springs - Importance of buffer rubbers - Importance of replacing defective springs - Locations of steel springs Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual	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	Services Assessment	Underpinning Knowledge		
		(b) Replacing leaf springs	Brainstorm: Guide the students to Define leaf spring Identify its advantages and disadvantages over the other types of steel springs Demonstration: Organize the students in manageable groups and demonstrate how to lubricate the bushes of leaf spring Hands-on activities: Guide students in manageable groups through hands-on activities to replace leaf springs	The student should be able to: - Select tools, equipment and safety gear - Use service manual - Identify and locate leaf springs - Inspect the leaf spring and to identify faults - Replace leaf spring - Test leaf spring performance - Observe safety precautions - Clean, tools, equipment and work place - Store tools and equipment	Leaf spring are replaced as per technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: - Inspect suspension leaf springs - Replace defective leaf springs Principles: The student should explain the principles involved in replacing leaf springs Theories: The student should explain: - Procedures for replacing leaf spring - Importance of replacing defective leaf spring Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual	The following tools, equipment and safety gears 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	Services Assessment	Underpinning Knowledge		
		(c) Replacing torsion bars	Brainstorm: Guide the students to Explain the meaning of torsional bar Describe the construction of the torsional bar Practical Work: Guide the student on how to identify and use tools and equipment for replacing the torsional bar and store them as per technical specifications Activity: Organize the students in manageable groups to replace the torsional bar	The student should be able to: - Select tools, equipment and safety gear - Use service manual - Identify and locate torsion bars - Inspect the torsion bar and to identify faults - Replace torsion bar - Test torsion bar performance - Observe safety precautions - Clean, tools, equipment and workplace - Store tools and equipment	Torsion bar replaced as per technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: - Inspect suspension torsion bars - Replace defective torsion bars Principles: The student should explain the principles involved in replacing torsion bars Theories: The student should explain: - Procedures for replacing torsion bars - Importance of replacing defective torsion bars Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual	The following tools, equipment and safety gears 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	Services Assessment	Underpinning Knowledge		
2.0 Carrying out engine maintenance	2.1 Performing engine non destruction tests	(a) Performing engine compression test	Brainstorm: Guide the students to Identify different components of the engine and state their functions Classify automotive engines Describe the construction and operation of the engine Also, encourage them to use the internet and library books to explore different modern engine technologies Practical Work: Guide the student on how to prepare the engine, tools and equipment for performing the engine compression test Activity:	The student should be able to: - Select tools, equipment and safety gear - Use service manual - Prepare tools and engine ready for performing the test - Perform engine compressions test - Observe safety precautions - Clean tools, equipment and work place - Store tools and equipment	Engine compression test conducted 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 involved in performing engine compression test Theories: The student should explain: - Types of engines - Engine components - Importance of performing engine compression tests Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual	- The following tools, equipment and safety gears are to be available: - Petrol engine and diesel engine - Petrol engine compression tester - Diesel engine compression tester - Spark plug spanner - Engine analyzer - Tool kit - Data book/service manual - Gloves	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	Services Assessment	Underpinning Knowledge		
			Organize the students in manageable groups to perform engine compression test				• Safety clear glasses • Overall • Safety boots	
		(b) Performing cylinder leakage test	Brainstorm: Guide the students to differentiate compression test from leak test Also, encourage them to use the internet and library books to explore differences between destructive and non-destructive test of engine modern engine Technologies Practical Work: Guide the student on how to prepare the engine, tools and equipment for performing an engine leak test	The student should be able to: • Select tools, equipment and safety gear • Use the service manual • Perform engine leakage test • Observe safety precautions • Clean tools, equipment and work place • Store tools and equipment	The engine cylinder leakage test conducted conforms to the manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: • Prepare engine for leakage test • Perform engine leakage test Principles: The student should explain the principles of: • Engine construction and operation Theories: The student should explain: • Function of engines • Types of engines • Engine components • Importance of performing cylinder leakage tests	The following tools, equipment and safety gears are to be available: • Petrol engine and diesel engine • Petrol cylinder leakage tester • Diesel cylinder leakage tester • Spark plug spanner • Engine analyzer • 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	Services Assessment	Underpinning Knowledge		
			Hands-on activities: Guide students in manageable groups through hands-on activities to perform engine leak test			Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual	- Data book/service manual - Gloves - Safety clear glasses - Overall - Safety boots	
	2.2 Adjusting valve clearance	(a) Performing valve overlap adjustment	Brainstorm: Guide the students to Explain the meaning of valve train mechanism adjustment Identify the advantages of proper valve adjustment Practical Work: Guide the student on how to prepare the engine, tools and equipment for one-to-one valve adjustments Hands-on activities: Guide students in manageable groups through hands-on	The student should be able to: - Select tools, equipment and safety gear - Use of service manual - Locate the cylinder head and identify the valves to be adjusted - Perform valve overlap adjustment - Identify overlap position - Observe safety precautions	Adjusted valve clearance conforms to manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to perform valve adjustment: - Valves overlap adjustment method Principles: The student should explain the principles of the construction of the valve train mechanism Theories: The student should explain: - Effects of incorrect valve clearance on the engine - Advantage of overhead camshaft engines compared	The following tools, equipment and safety gears are to be available: - Vehicle/petrol/diesel engine - Timing torch for petrol/diesel engines - Filler gauges - Torque wrenches - Tool kit - Service manual	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	Services Assessment	Underpinning Knowledge		
			activities to perform one to one valve adjustments	- Clean tools, equipment and work place - Store tools and equipment		to side cam shaft engines - Reasons for some engines which need no valve clearance adjustment Circumstantial knowledge: Detailed knowledge about: - Safety precautions Manufacture's service manual	- Wheel stoppers/wedges - Overall - Safety boots - Gloves - Safety clear glasses	
		(b) Performing one to one valve adjustment	Brainstorm: Guide the students to Differentiate valve overlap adjustment from one-to-one valve adjustment Identify the advantages of proper valve adjustment Practical Work: Guide the student on how to prepare the engine, tools and equipment for	The student should be able to: - Select tools, equipment and safety gear - Use of service manual - Prepare the engine for one-to-one valve adjustment - Perform one to one valve adjustment - Observe safety precautions	Adjusted valve clearance conforms to manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to perform valve adjustment: One to one valve adjustment method Principles: The student should explain the principles of construction of valve train mechanism Theories: The student should explain:	The following tools, equipment and safety gears are to be available: - Vehicle - Timing torch for petrol/diesel engines - Filler gauges - Torque wrenches - 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	Services Assessment	Underpinning Knowledge		
			overlapping valve adjustments Activity: Organize the students in manageable groups and guide them to perform valve overlapping adjustments	- Clean tools, equipment and work place - Store tools and equipment		- Effects of incorrect valve clearance on engine - Piston pairs - Advantage of overhead camshaft compared to side cam shaft - Reasons for some engines which need no valve clearance adjustment Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual	- Service manual - Wheel stoppers/wedges - Overall - Safety boots - Gloves - Safety clear glasses	
	2.3 Carrying out ignition timing	(a) Performing spark ignition timing	Brainstorm: Guide the students to Explain the meaning of ignition timing Differentiate ignition timing in spark ignition engines and compression ignition engine	The student should be able to: - Select tools, equipment and safety gear - Use the service manual - Prepare the engine for	Performed spark ignition timing conforms to manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: Perform petrol engine ignition timing	The following tools, equipment and safety gears are to be available: - Vehicle or petrol engine - Timing torch for	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	Services Assessment	Underpinning Knowledge		
			Practical Work: Guide the student on how to identify and use tools and equipment for performing ignition timing in spark ignition engines Demonstration: Organize the students in a manageable and demonstrate how to perform ignition timing in spark ignition engines	performing timing - Identify timing marks - Perform ignition timing - Test engine performance - Observe safety precautions - Clean tools, equipment and work place - Store tools and equipment		Principles: The student should explain the principles of: - Operation of spark ignition engine - Setting spark ignition timing Theories: The student should explain: - Importance of correctly timing the spark ignition system - Effects of wrong timing - Ignition timing process Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual	petrol engines - Tool kit - Service manual - Container – (small) with a flexible pipe - Service lamp - Wheel stoppers/wedges - Overall - Safety boots - Gloves - Safety clear glasses	
		(b) Performing compression	Brainstorm: Guide the students to Identify the effects of wrong	The student should be able to: Select tools, equipment and safety gear	Performed compression ignition timing conforms to	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to:	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	Services Assessment	Underpinning Knowledge		
		ignition timing	compression ignition timing Practical Work: Guide the student on how to identify and use tools and equipment for performing ignition timing in compression ignition engines Demonstration: Organize the students in a manageable and demonstrate how to perform compression timing in spark ignition engines	• Use the service manual • Prepare the engine for performing timing • Identify timing marks • Perform ignition timing • Test engine performance • Observe safety precautions • Clean tools, equipment and workplace • Store tools and equipment	the manufacturer's specifications	• Perform compression ignition timing Principles: The student should explain the principles of: • Operation of compression ignition • Setting compression ignition timing Theories: The student should explain: • Importance of correct timing the compression ignition system • Effects of wrong timing • Ignition timing process Circumstantial knowledge: Detailed knowledge about: • Safety precautions • Manufacture's service manual	• Vehicle or petrol engine • Timing torch for petrol engines • Tool kit • Service manual • Container – (small) with a flexible pipe • Service lamp • Wheel stoppers/wedges • 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	Services Assessment	Underpinning Knowledge		
3.0 Maintaining charging system	3.1 Servicing charging systems	(a) Diagnosing charging system	Brainstorm: Guide the students to Define charging system Describe the construction and operation of the charging system identify possible faults in charging systems Practical Work: Guide the student on how to diagnose and isolate faults of the charging system Activity: Organize the students in manageable groups to troubleshoot the charging system Also encourage them to use internet manufacturers' manuals	The student should be able to: - Select tools, equipment and safety gears - Remove alternator from vehicle engine - Locate charging system components - Perform visual inspection to charging system components - Test charging systems components for defects - Observe safety - Clean tools, equipment and workplace - Store tools and equipment	Diagnosed charging system conforms to manufacture's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to diagnose charging systems Principles: The student should explain the principle involved in diagnosing charging systems Theories: The student should explain: - Aim of charging system - Components of charging system - Possible faults, causes and remedies of charging system Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual	This element can be achieved at a school workshop The following tools, equipment and safety gears should be available: - Vehicle - Electrical bench and vice - Tool kit - Digital and analog multi-meters - Test light - Clamp meter - Overcoat - Safety boots - Safety glass	54

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
		(b) Rectifying charging system faults	Brainstorm: Guide the students to identify possible causes of faults in charging systems Practical Work: Guide the student on how to identify and use tools and equipment for repairing charging system and store them as per technical specifications Hands-on activities: Guide students in manageable groups through hands-on activities to repair different charging system components. Also encourage them to use internet manufacturers' manuals	The student should be able to: - Select tools, equipment and safety gears - Service charging system components - Repair or replace the faulty components - Replace faulty components - Test the performance of charging system - Observe safety - Clean tools, equipment and workplace - Store tools and equipment	Rectified charging system conforms to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to rectify fault components of charging systems Principles: The student should explain the principles involved in rectifying charging system faults Theories: The student should explain: - Procedures for rectifying charging system - Possible faults, causes and their remedies in the charging system - Modern technologies used in automotive charging systems Circumstantial knowledge: Detailed knowledge about: - Safety precautions	The following tools, equipment and safety gears are to be available: - Vehicle - Electrical bench and vice - Tool kit - Digital and analog multi-meters - Test light - Clamp meter - Overcoat - 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	Services Assessment	Underpinning Knowledge		
						Manufacture's service manual		
	3.2 Servicing alternators	(a) Diagnosing alternators	Brainstorm: Guide the students to define alternators Describe the construction and operation of alternators Identify common faults of alternators Practical Work: Guide the student on how to identify and locate faults components of the alternators Activity: Organize the students in manageable groups to use different tools and equipment to diagnose alternators Also encourage them to use internet manufacturers'	The student should be able to: - Select tools, equipment and safety gears - Measure alternator output - Remove alternator from vehicle engine - Dismantle alternator - Diagnose components for defects - Observe safety - Clean tools, equipment and workplace - Store tools and equipment	Diagnosed faults of alternator are isolated as per technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: - Remove alternator from vehicle - Dismantle alternator - Assemble alternator - Test alternator on bench - Measure alternator output while engine running Principles: The student should explain the principles involved in diagnosing alternators Theories: The student should be able to explain: - Alternator components - Alternator operation - Magnetism principles	The following tools, equipment and safety gears are to be available: - Vehicle - Electrical bench and vice - Tool kit - Digital and analog multi-meters - Test light - Clamp meter - Overcoat - Safety boots - Safety glass	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	Services Assessment	Underpinning Knowledge		
			manuals and library books to explore different modern methods, tools and equipment for diagnosis and faulty finding			- Rectification process - Fleming's rule - Types of alternators Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual		
		(b) Rectifying alternators faults	Brainstorm: Guide the students to identify possible causes of alternator faults Practical Work: Guide the student on how to identify and use tools and equipment for repairing alternators and store them as per technical specifications Hands-on activities: Guide students in	The student should be able to: - Select tools, equipment and safety gears - Disassemble alternator - Perform visual inspection to the alternator - Repair fault alternator components - Replace fault alternator components	Serviced alternator conforms to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: - Disassemble and assemble alternator Principles: The student should explain the principles of: - Voltage regulation - Operation of alternator Theories: The student should be able to explain: - Procedures for rectifying alternator	The following tools, equipment and safety gears are to be available: - Vehicle - Electrical bench and vice - Tool kit - Digital and analog multi-meters - Test light - Clamp meter - Overcoat	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
			manageable groups through hands-on activities to rectify different alternator faults	- Assemble alternator - Test alternator performance on bench - Fit alternator to engine - Measure alternator output while engine is running - Observe safety - Clean tools, equipment and workplace - Store tools and equipment		- Alternator operation - Alternator components - Possible alternator faults, causes and remedies Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual	- Safety boots - Safety glass	
4.0 Maintaining accessories, circuits and components	4.1 Servicing radio systems	(a) Diagnosing radios	Brainstorm: Guide the students to Explain the meaning of accessories, circuits and components Identify radio faults Practical Work: Guide the student on how to identify and	The student should be able to: - Select tools, equipment and safety gears - Interpret radio circuit diagrams - Identify and locate the radio	Diagnosed faulty radio components are isolated as per technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain: Diagnostic procedure of radio components and circuits Principles: The student should explain the principles of: -	The following tools, equipment and safety gears are to be available: - Vehicle - Tool kit - Test lamp	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	Services Assessment	Underpinning Knowledge		
			locate faulty radio faults components Activity: Organize the students in manageable groups to diagnose radio components and circuit. Also encourage them to use internet manufacturers' manuals and library books to explore different modern methods, tools and equipment for diagnosis and fault findings	circuit and its components - Remove radio from the vehicle - Check radio circuit components - Observe safety - Clean tools and equipment - Store tools and equipment		- Diagnosing radio and related circuits Theories: The student should explain: - Parts of radio system - Causes of interference in vehicle - Types of radio systems - Possible faults in radio system, causes and remedies Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacturer's service manual	- Digital and analogue multi-meters - Soldering gun - Overcoat - Safety boots - Gloves - Safety glass	
		(b) Rectifying radio faults	Brainstorm: Guide the students to identify possible causes of radio faults Practical Work:	The student should be able to: - Interpret radio circuit diagrams - Select tools, equipment and safety gears	Radio faults are rectified according to manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain: How to service radio system	The following tools, equipment and safety gears are to be available: - Vehicle - 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	Services Assessment	Underpinning Knowledge		
			Guide the student on how to identify and use tools and equipment for repairing radios and store them as per technical specifications Hands-on activities: Guide students in manageable groups through hands-on activities to rectify different radio faults	- Perform visual inspection of radio components and circuits - Repair faulty radio components - Replace faulty radio components - Service the radio circuit - Refit radio to the vehicle - Test radio system - Observe safety - Clean tools and equipment - Store tools and equipment		- Rectifying procedure of radio systems Principles: The student should explain the principles of:- - Servicing radio systems - Suppressing radio interference: Theories: The student should explain: - Parts of radio system - Causes of interference in vehicle - Types of radio systems - Functions of different components for rectifying radio faults - Modern radio technologies (android radio)	- Test lamp - Electronic leak tester - Speed rite digital fault finder - Digital and analogue multi-meters - Soldering gun - Overcoat - Safety boots - Gloves - 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	Services Assessment	Underpinning Knowledge		
						- Faults in radio system, causes and remedies Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual		
	4.2 Servicing audio-visual (TV) systems	(a) Diagnosing audio-visual systems	Brainstorm: Guide the students to identify audio-visual systems components Practical Work: Guide the student on how to identify and use tools and equipment for diagnosing audio-visual faults and store them as per technical specifications Activity: Organize the students in	The student should be able to: - Select tools - Interpret audio visual system circuits - Identify and locate of audio-visual systems - Perform visual inspection of audio-visual Test audio visual system - Observe safety - Clean tools and equipment	Diagnosed audio visual (TV) faulty components are identified according to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain: - Diagnostic procedure of audio-visual systems Principles: The student should explain the principles of: - diagnosing audio visual (TV) systems Theories: The student should explain: - Parts of audio-visual system - Application of audio-visual system	The following tools, equipment and safety gears are to be available: - Vehicle - Tool kit - Test lamp - Digital and analogue multi-meters - Overcoat - Safety boots - Gloves - Safety glass	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	Services Assessment	Underpinning Knowledge		
			manageable groups to diagnose audio-visual components and circuit. Also encourage them to use internet manufacturers' manuals and library books to explore different modern methods, tools and equipment for diagnosis and fault findings	Store tools and equipment		- Types of audio-visual systems - Faults in audio visual system, causes and remedies Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacturer's service manual		
		(b) Rectifying audio-visual faults	Brainstorm: Guide the students to identify possible causes of radio faults Practical Work: Guide the student on how to identify and use tools and equipment for repairing radios and store them as per technical specifications	The student should be able to: - Select tools - Interpret audio visual system circuits - Perform visual inspection of audio-visual - Repair audio-visual system components - Replace defective audio-	Rectified audio visual (TV) system works according to manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain: - How to rectify audio visual system faults Principles: The student should explain the principles of: - Servicing audio visual (TV) systems Theories: The student should explain:	The following tools, equipment and safety gears are to be available: - Vehicle - Tool kit - Test lamp - Digital and analogue multi-meters - Overcoat	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
			Hands-on activities: Guide students in manageable groups through hands-on activities to rectify different radio faults	visual stem components - Service audio-visual system components - Test audio visual system - Observe safety - Clean tools and equipment - Store tools and equipment		- Parts of audio-visual system - Function of different tools and equipment for rectifying audio-visual systems - Faults in audio visual system, causes and remedies Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual	- Safety boots - Gloves - Safety glass	
	4.3 Servicing defogger's systems	(a) Diagnosing defogger system faults	Brainstorm: Guide the students to Explain the meaning of defoggers Describe the construction and operation of defogger system components Also encourage them to use internet	The student should be able to: - Select tools, equipment and safety gears - Interpret defogger circuits - Identify and locate	Diagnosed defoggers operate as specified by the manufacturer	Knowledge evidence: Detailed knowledge of: Method used: The student should explain: Diagnostic procedure for defoggers Principles: The student should explain the principles of diagnosing defoggers	The following tools, equipment and safety gears are to be available: - Vehicle - Tools kit - Multi-meters - Test lamp	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	Services Assessment	Underpinning Knowledge		
			manufacturers' manuals and library books to explore different modern methods, tools and equipment for diagnosis and fault findings Practical Work: Guide the student on how to identify and use tools and equipment for diagnosing audio-visual faults and store them as per technical specifications Activity: Organize the students in manageable groups to diagnose audio-visual components and circuit	defogger's components - Perform visual inspection to defogger's components - Test defogger system components - Observe safety - Cleans tools and equipment - Store tools and equipment		Theories: The student should explain: - Parts of defogger system - Operation of defoggers - Types of defogger systems Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual	- Safety boots - Safety glass - Gloves - Overcoat	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
		(b) Rectifying defogger faults	Brainstorm: Guide the students to identify possible causes of defogger faults Demonstration: Organize the students in manageable groups and demonstrate to them how to rectify defogger faults Hands-on activities: Guide students in manageable groups through hands-on activities to rectify different defogger faults	The student should be able to: - Select tools, equipment and safety gears - Interpret defogger circuits - Diagnose system circuit faults - Repair faulty defoggers components - Replace defective defoggers components - Service defoggers circuit - Test defogger system - Observe safety - Cleans tools and equipment - Store tools and equipment	Defoggers faults are rectified as per technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain: - How to service defoggers Principles: The student should explain the principles involved in rectifying defoggers Theories: The student should explain: - Procedures for rectifying defoggers faults - The importance of rectifying the defogger system Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual	The following tools, equipment and safety gears are to be available: - Vehicle - Tools kit - Multi-meters - Test lamp - Safety boots - Safety glass - Gloves - Overcoat	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
		(c) Troubleshooting electronic-headed windshield	Brainstorm: Guide the students to brainstorm on the concepts and principles of the electronic-headed windshield Demonstration: Organize students in manageable groups and demonstrate how to use different tools and equipment to diagnose the faults of electronic-headed windshield Hands-on activities: Guide students in manageable groups through hands-on activities to rectify faults of electronic-headed windshield	The student should be able to: - Select tools, equipment and safety gears - Interpret electronic-headed windshield circuits - Diagnose electronic-headed windshield faults - Rectify electronic-headed windshield faulty parts - Test the electronic-headed windshield system - Observe safety - Clean tools and equipment	Troubleshooted electronic-headed windshield operate as specified by the manufacturer	Knowledge evidence: Detailed knowledge of: Method used: The student should explain: - How to troubleshoot electronic-headed windshields Principles: The student should explain the principles involved in troubleshooting electronic-headed windshield Theories: The student should explain: - Describe the construction and operation of electronic-headed windshield - components of electronic-headed windshield system Circumstantial knowledge: Detailed knowledge about: - Safety precautions	The following tools, equipment and safety gears are to be available: - Vehicle - Tools kit - Multi-meters - Test lamp - Safety boots - Safety glass - Gloves - Overcoat	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
				Store tools and equipment		Manufacture's service manual		
	4.4 Servicing air bag system	(a) Diagnosing air bag system	Brainstorm: Guide the students to brainstorm on the concepts and principles of diagnosing airbag system Practical Work: Guide the student on how to identify and use tools and equipment for diagnosing airbag faults and store them as per technical specifications Hands-on activities: Guide students in manageable groups through hands-on activities to diagnose air bag components and circuits	The student should be able to: - Select tools, equipment and safety gears - Interpret wiring circuit of air bag circuit - Identify and located air bag system components - Diagnose the air bag system - Test air bag system - Observe safety - Clean tools and equipment - Store tools and equipment	Diagnosed air bag system faults are isolated works as per technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain: - Diagnostic procedure of air bag system Principles: The student should explain the principles involved in diagnosing air bag system Theories: The student should explain: - Construction and operation of airbag system - Components of air bag system - Importance of air bag systems Circumstantial knowledge Detailed knowledge about:	The following tools, equipment and safety gears are to be available: - Vehicle - Tool kit - Multi-meters - Test lamp - Electronic leak tester - Overcoat - Safety boots - Safety glass Gloves	36

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
						- Safety precautions while repairing air bag systems - Safe handling of work tools and equipment Waste disposal		
		(b) Rectifying air bag components	Brainstorm: Guide the students to identify possible causes and remedies of air bag faults. Also encourage them to use internet, manufacturers' manuals and library books to explore different modern methods, tools and equipment for diagnosis and faulty Demonstration: Organize the students in manageable groups and demonstrate to them how to use different tools and equipment to rectify	The student should be able to: - Select tools, equipment and safety gears - Interpret the wiring circuit of the airbag - Inspect the airbag system components - Repair the faulty airbag components - Replace the defective airbag components - Service the air bag system - Test airbag system	Rectified air bag system works as per manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to rectify air bag components Principles: The student should explain the principles involved in rectifying air bag system Theories: The student should explain: - Procedures for rectifying air bag components - Importance of rectifying faulty airbag system components - Possible causes and remedies of airbag faults	The following tools, equipment and safety gears are to be available: - Vehicle - Tool kit - Multi-meters - Test lamp - Electronic leak tester - 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	Services Assessment	Underpinning Knowledge		
			different diagnosed faults of airbag as per technical specifications Hands-on activities: Guide students in manageable groups through hands-on activities to rectify different airbag faults findings	- Observe safety - Clean tools and equipment - Store tools and equipment		Circumstantial knowledge: Detailed knowledge about: Safety precautions Manufacture's service manual		
	4.5 Servicing electric horn systems	(a) Diagnosing electric horn circuit	Brainstorm: Guide the students to brainstorm on the concepts and principles of diagnosing electric horn circuit Practical Work: Guide the student on how to identify and use tools and equipment for diagnosing electric horn faults and store them as per technical specifications	The student should be able to: - Select tools, equipment and safety gears - Interpret circuit diagrams of the electric horn system - Identify and locate the horn system components - Inspect the components of the electric horn system	Diagnosed electric horn faults are isolated as per technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to diagnose electric horn circuit Principles: The student should explain the principles involved in diagnosing electric horn systems Theories: The student should explain: Meaning and function of electric horn	The following tools, equipment and safety gears are to be available: - Vehicle - Tool kit - Multi-meters - Test lamp - Electronic leak tester - Overcoat - Safety boots - Safety glass - 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	Services Assessment	Underpinning Knowledge		
			Hands-on activities: Guide students in manageable groups through hands-on activities to diagnose electric horn components and circuit faults	• Test horn system • Observe safety • Clean tools and equipment • Store tools and equipment		• components of electric horn systems • Types of vehicle horn • Application of horn in vehicle Circumstantial knowledge: Detailed knowledge about: • Safety precautions • Manufacture's service manual		
		(b) Rectifying electric horn components	Brainstorm: Guide the students to identify possible causes of electric horn faults. Also encourage them to use internet, manufacturers' manuals and library books to explore different modern methods, tools and equipment for diagnosis and faulty findings	The student should be able to: • Select tools, equipment and safety gears • Interpret circuit diagrams of the electric horn system • Inspect the electric horn circuit • Diagnose electric horn system faults	Rectified electric horn system operates according to manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain: • How to rectify electric horn systems Principles: The student should explain the principles involved in rectifying electric horn systems Theories: The student should explain:	The following tools, equipment and safety gears are to be available: • Vehicle • Tool kit • Multi-meters • Test lamp • Electronic leak tester • Overcoat	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
			Demonstration: Organize the students in manageable groups and demonstrate to them how to use different tools and equipment to rectify different diagnosed faults of electric horn as per technical specifications Hands-on activities: Guide students in manageable groups through hands-on activities to rectify different electric horn faults	- Repair the faulty electric horn components - Repair the defective electric horn components - Test horn system - Observe safety - Clean tools and equipment - Store tools and equipment		- Procedures for rectifying electric horn circuit - Faults in electric horn systems, causes and remedies Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual	- Safety boots - Safety glass - Gloves	
	4.6 Servicing wiper and washer systems	(a) Diagnosing the wiper and washer system	Brainstorm: Guide the students to Explain the meaning of wiper and washer system Practical Work:	The student should be able to: - Select tools, equipment and safety gear - Interpret circuit diagrams of	Diagnosed faults of wiper and washer system are isolated as per technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to diagnose the wiper and washer system	The following tools, equipment and safety gears are to be available: - Vehicle - Tool kit	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	Services Assessment	Underpinning Knowledge		
			Guide the student on how to diagnosing wiper and washer system Hands-on activities: Guide students in manageable groups through hands-on activities to diagnose wiper and washer components and circuit faults	wiper and washer systems - Identify and locate the components of the wiper and washer system - Inspect the components of the wiper and washer system - Test the components of wiper and washer system - Observe safety - Clean tools and equipment - Store tools and equipment		Principles: The student should explain the principles involved in diagnosing wiper and washer systems Theories: The student should explain: - Functions of wiper and washer system - Operation of wiper and washer system - Components of wiper and washer system - Application of wiper and washer system in vehicles Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual	- Multi-meters - Soldering gun and wire - Test lamp - Overcoat - Safety boots - Safety gloves - Safety glass	
		(b) Rectifying wiper and washer system	Brainstorm: Guide the students to identify possible causes of wiper and washer system faults	The student should be able to: Select tools, equipment and safety gears	Rectified wiper and washer system works as per	Knowledge evidence: Detailed knowledge of: Method used: The student should explain:	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	Services Assessment	Underpinning Knowledge		
		components	Demonstration: Organize the students in manageable groups and demonstrate to them how to rectify different diagnosed faults of wiper and washer system as per technical specifications Hands-on activities: Guide students in manageable groups through hands-on activities to rectify different wiper and washer system	- Interpret circuit diagrams of wiper and washer systems - Inspect the wiper and washer system - Repair faulty components of the wiper and washer system - Replace defective components of wiper and washer system - Service the wiper and washer system circuit - Test system - Observe safety - Clean tools and equipment - Store tools and equipment	manufacturer's specifications	- How to rectify wiper and washer systems Principles: The student should explain the principles involved in rectifying wiper and washer systems Theories: The student should explain: - Procedures for rectifying wiper and washer system components - Possible faults, causes and remedies of wiper and washer system Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacturer's service manual	- Vehicle - Tool kit - Multi-meters - Soldering gun and wire - Test lamp - Overcoat - Safety boots - Safety gloves - Safety glass	
5.0 Maintaining ignition systems	5.1 Servicing convention	(a) Diagnosing convention	Brainstorm: Guide the students to brainstorm on the	The student should be able to:	Diagnosed conventional ignition	Knowledge evidence: Detailed knowledge of:	The following tools, equipment and safety gears	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	Services Assessment	Underpinning Knowledge		
	al ignition systems	onal ignition system	concepts and principles of conventional ignition system. Also encourage them to use interment and library books to search and explore modern technologies related to ignition system Practical Work: Guide the student on how to identify and locate components of conventional ignition system Activity: Organize the students in manageable groups to diagnose conventional ignition system components and circuit faults	• Select tools, equipment and safety gear • Interpret circuit diagram of conventional ignition system • Identify and locate conventional ignition system components • Inspect the conventional ignition system components • Read the fault codes of conventional ignition system • Test conventional ignition system components • Observe safety • Clean tools and equipment • Store tools and equipment	system faults are isolated as per technical specifications	Method used: The student should explain: • How to diagnose of conventional ignition systems • Diagnostic procedures of conventional ignition systems Principles: The student should explain the principles involved in diagnosing conventional ignition system Theories: The student should explain: • Types of ignition systems • Describe the construction and operation of ignition system • Function of conventional ignition system • components of the conventional ignition systems	are to be available: • Vehicle • Tool kit • OBD scan tool • Multi-meters • Test lamp • Overcoat • Safety boot • Safety glass • Safety 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	Services Assessment	Underpinning Knowledge		
						Circumstantial knowledge: Detailed knowledge about: • Safety precautions • Manufacture's service manual		
		(b) Rectifying conventional ignition system	Brainstorm: Guide the students to identify possible causes of conventional ignition system faults Demonstration: Organize the students in manageable groups and demonstrate to them how to use different tools and equipment to rectify different diagnosed faults of conventional ignition system as per technical specifications Activity:	The student should be able to: • Select tools, equipment and safety gear • Interpret circuit diagram of conventional ignition system • Diagnose ignition system faults • Repair faulty conventional ignition system components • Replace defective conventional ignition system components	Rectified conventional ignition system functions as per technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain: • How to rectify faults of conventional ignition systems Principles: The student should explain the principles involved in rectifying conventional ignition system Theories: The student should explain: • Procedures for rectifying conventional ignition system • Faults in convention ignition	The following tools, equipment and safety gears are to be available: • Vehicle • Tool kit • OBD scan tool • Multi-meters • Test lamp • Overcoat • Safety boot • Safety glass • Safety 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	Services Assessment	Underpinning Knowledge		
			Organize the students in manageable groups to rectify different conventional ignition system	• Clear ignition system faults • Test conventional ignition system • Observe safety • Clean tools and equipment • Store tools and equipment		systems, causes and remedies Circumstantial knowledge: Detailed knowledge about: • Safety precautions • Manufacture's service manual		
		(c) Servicing magneto ignition system	Brainstorm: Guide the students to Define magneto ignition system Describe the construction and operation of the magneto ignition system Differentiate magneto from battery ignition system Demonstration: Organize the students in manageable groups and demonstrate to	The student should be able to: • Select tools, equipment and safety gear • Diagnose magneto ignition system faults • Rectify magneto ignition system faults • Test magneto ignition system • Observe safety • Clean tools and equipment • Store tools and equipment	Serviced magneto ignition system functions as per technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to service magneto ignition system Principles: The student should explain the principles involved in servicing magneto ignition system Theories: The student should explain: • Components of the magneto ignition systems • Faults diagnostic procedure for	The following tools, equipment and safety gears are to be available: • Vehicle • Tool kit • OBD scan tool • Multi-meters • Test lamp • Overcoat • Safety boot • Safety glass • Safety 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	Services Assessment	Underpinning Knowledge		
			them how to diagnose faults of magneto ignition system Practical Work: Guide the student on how to identify, locate and diagnose components of magneto ignition system faults as per technical specifications Activity: Organize the students in manageable groups to troubleshoot magneto ignition system components and circuit faults			magneto ignition system, causes and remedies Circumstantial knowledge: Detailed knowledge about: • Safety precautions • Manufacture's service manual		
	5.2 Servicing computerized ignition systems	(a) Diagnosing computerized ignition system	Brainstorm: Guide the students to Define computerized ignition system Describe the construction and operation of	The student should be able to: Select tools, equipment and safety gear • Interpret computerized	Serviced computerized ignition system functions as per technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain: • How to service computerized ignition systems	The following tools, equipment and safety gears are to be available: • Vehicle • Tool kit	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	Services Assessment	Underpinning Knowledge		
			computerized ignition system faults of computerized ignition system Practical Work: Guide the student on how to identify and locate faulty components of computerized ignition system Activity: Organize the students in manageable groups to diagnose computerized ignition system components and circuit faults	ignition circuit diagram - Identify and locate the components of computerized ignition system - Inspect the components of computerized ignition system - Check the components computerized ignition system - Test computerized ignition system components - Read fault codes by using car scan tool - Observe safety - Clean tools and equipment - Store tools and equipment		- Diagnostic procedure of computerized ignition systems Principles: The student should explain the principles involved in diagnosing computerized ignition system Theories: The student should explain: - components of computerized ignition system - Functions of components in the system Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual	- OBD scan tool - Multi-meters - Test lamp - Overcoat - Safety boot - Safety glass - Safety gloves	
		(b) Rectifying computeriz	Brainstorm: Guide the students to	The student should be able to:	Rectified computerized	Knowledge evidence: Detailed knowledge of:	The following tools, 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	Services Assessment	Underpinning Knowledge		
		ed ignition system components	identify possible causes of computerized ignition system faults Demonstration: Organize the students in manageable groups and demonstrate to them how to rectify faults of computerized ignition system also demonstrate to them how to use OBD scan tools to find faults of computerized ignition system Activity: Organize the students in manageable groups to rectify different computerized ignition system faults	- Select tools, equipment and safety gear - Interpret computerized ignition circuit diagram - Diagnose computerized ignition faults - Repair faulty computerized ignition components - Replace defective computerized ignition components - Clear fault codes - Test computerized ignition system - Observe safety - Clean tools and equipment	ignition system functions as per technical specifications	Method used: The student should explain how to rectify computerized ignition systems Principles: The student should explain the principles involved in rectifying computerized ignition system components Theories: The student should explain: - Procedures for rectifying computerized ignition systems - Possible faults, causes and remedies of service computerized ignition systems Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual	and safety gears are to be available: - Vehicle - Tool kit - Multi-meters - Test light - Scanners - Electronic leak tester - 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	Services Assessment	Underpinning Knowledge		
				Store tools and equipment				
	5.3 Servicing electronic ignition systems	(a) Diagnosing Inductive distributor ignition system	Brainstorm: Guide the students to Define electronic ignition system and differentiate it from other types of ignition systems Explain the meaning of Inductive distributor ignition system Describe the construction and operation of Inductive distributor ignition system Practical Work: Guide the student on how to identify and locate faulty components of Inductive distributor ignition system Activity:	The student should be able to: - Select tools, equipment and safety gear - Interpret Inductive distributor ignition circuit diagram - Identify and locate the Inductive distributor ignition system - Inspect the components of Inductive distributor ignition - Check the Inductive distributor ignition system - Test Inductive distributor	Diagnosed Inductive distributor ignition system faults are isolated as per technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to diagnose Inductive distributor ignition system Principles: The student should explain the principles involved in diagnosing Inductive distributor ignition system Theories: The student should explain: - Meaning of electronic ignition system - Construction and operation of Inductive distributor ignition system - Parts of Inductive distributor ignition - Operation of Inductive	The following tools, equipment and safety gears are to be available: - Vehicle - Tool kit - Multi-meters - Test light - Scanners - Electronic leak tester - Overcoat - Safety boots - Safety glass - Gloves	53

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
			Organize the students in manageable groups to diagnose Inductive distributor ignition system components and circuit faults	ignition system components - Read fault codes by using car scan tool - Observe safety - Clean tools and equipment - Store tools and equipment		distributor ignition system - Faults in electronic ignition, Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual		
		(b) Rectifying Inductive distributor ignition system faults	Brainstorm: Guide the students to identify possible causes of Inductive distributor ignition system faults Demonstration: Organize the students in manageable groups and demonstrate to them how to rectify Inductive distributor ignition system faults Activity:	The student should be able to: - The student should be able to: - Select tools, equipment and safety gear - Interpret the Inductive distributor circuit diagram - Diagnose Inductive distributor faults - Repair faulty Inductive	Rectified inductive distributor ignition system functions as per manufacturers specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain: - How to rectify Inductive distributor systems - Clear fault codes related to ignition system Principles: The student should explain the principles involved in rectifying Inductive distributor ignition system faults Theories: The student should explain:	The following tools, equipment and safety gears are to be available: - Vehicle - Tool kit - Multi-meters - Test light - Scanners - Electronic leak tester - Overcoat - 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	Services Assessment	Underpinning Knowledge		
			Organize the students in manageable groups to rectify Inductive distributor ignition system faults	distributor components - Replace defective Inductive distributor components - Clear fault codes - Test Inductive distributor system - Observe safety - Clean tools and equipment - Store tools and equipment		- Procedures for rectifying Inductive distributor systems faults - Possible faults, causes and remedies of Inductive distributor systems Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual	Gloves	
		(c) Diagnosing Hall Effect distributor ignition system	Brainstorm: Guide the students to explain the Hall Effect ignition system Practical Work: Guide the student on how to identify and locate faulty components of Hall Effect distributor ignition system	The student should be able to: - Select tools, equipment and safety gear - Interpret Inductive distributor ignition circuit diagram	Diagnosed Hall Effect distributor ignition system faults are isolated as per technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to diagnose Hall Effect distributor ignition system Principles: The student should explain how involved in diagnosing Hall Effect distributor ignition system	The following tools, equipment and safety gears are to be available: - Vehicle - Tool kit - Multi-meters - Test light - Scanners	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
			Activity: Organize the students in manageable groups to diagnose Hall Effect distributor ignition system components and circuit faults	- Identify and locate components - Inspect the components of Hall Effect distributor ignition - Check the Hall Effect distributor ignition system - Test Hall Effect distributor ignition system components - Read fault codes by using car scan tool - Observe safety - Clean tools and equipment - Store tools and equipment		Theories: The student should explain: - Construction and operation of Hall Effect distributor ignition system - Components of Hall Effect distributor ignition - Operation of Hall Effect distributor ignition system Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual	- Electronic leak tester - Overcoat - Safety boots - Safety glass - Gloves	
		(d) Rectifying Hall Effect distributor ignition system	Brainstorm: Guide the students to identify possible causes of Hall Effect	The student should be able to: The student should be able to:	Rectified Hall Effect distributor ignition system	Knowledge evidence: Detailed knowledge of: Method used: The student should explain:	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	Services Assessment	Underpinning Knowledge		
		components	distributor ignition system faults Demonstration: Organize the students in manageable groups and demonstrate to them how to use different tools and equipment to rectify different diagnosed faults of Hall Effect distributor ignition system as per technical specifications Demonstrate to them how to use OBD system to find faults Activity: Organize the students in manageable groups to rectify different Hall Effect	- Select tools, equipment and safety gear - Interpret the Hall Effect distributor circuit diagram - Diagnose Hall Effect distributor faults - Repair faulty Hall Effect distributor components - Replace defective Hall Effect distributor components - Clear fault codes - Test Hall Effect distributor system - Observe safety - Clean tools and equipment	functions as per manufacturers specifications	- How to rectify Hall Effect distributor systems - Clear fault codes related to ignition system Principles: The student should explain the principles involved in rectifying Hall Effect distributor ignition system components Theories: The student should explain: - Procedures for Rectifying Hall Effect distributor ignition system components - Possible faults, causes and remedies of service Hall Effect distributor systems Circumstantial knowledge: Detailed knowledge about:	- Vehicle - Tool kit - Multi-meters - Test light - Scanners - Electronic leak tester - 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	Services Assessment	Underpinning Knowledge		
			distributor ignition system faults Also encourage them to use internet, manufacturers' manuals and library books to explore different modern methods, tools and equipment for diagnosis and faulty findings	Store tools and equipment		- Safety precautions - Manufacture's service manual		
6.0 Maintaining electric fuel systems	6.1 Servicing petrol fuel electric system	(a) Diagnosing petrol fuel electric system	Brainstorm: Guide the students to Define electric fuel systems Classify electric fuel systems Explain the meaning of petrol fuel electric system Describe the construction and operation of petrol fuel electric system Practical Work: Guide the student on how to identify and locate faulty	The student should be able to: - Select tools, equipment and safety gear - Interpret the circuit diagram - Identify and locate components of the petrol fuel electric system - Perform a visual inspection of the petrol fuel electric system components	Diagnosed petrol fuel electric system faults are isolated as per technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain: - Diagnostic procedure of petrol fuel electric systems Principles: The student should explain the principles of: - Operation of petrol fuel electric system - Diagnosing faulty parts of petrol fuel electric system	The following tools, equipment and safety gears are to be available: - Vehicle - Tool kit - Multi-meters - Test lamp - Overcoat - Diagnostic machines - Safety boots - Safety glass - Gloves	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	Services Assessment	Underpinning Knowledge		
			components of petrol fuel electric system Activity: Organize the students in manageable groups to diagnose petrol fuel electric system components and circuit faults	- Check all petrol fuel electrical system sensors - Observe safety precautions - Clean tools and equipment - Store tools and equipment		- Testing petrol fuel electric systems Theories: The student should explain: - Function of petrol fuel electric system - Components of petrol fuel electric system - Types of petrol fuel electric systems - petrol fuel electrical systems sensors - Modern technologies used in petrol-electric fuel systems - Faults in petrol fuel electric system, Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual		
		(b) Rectifying electronic	Brainstorm: Guide the students to	The student should be able to:	Rectified petrol fuel electric	Knowledge evidence: Detailed knowledge of:	The following tools, equipment and 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	Services Assessment	Underpinning Knowledge		
		petrol fuel components	identify possible causes of petrol fuel electric system faults Demonstration: Organize the students in manageable groups and demonstrate to them how to use different tools and equipment to rectify different diagnosed faults of petrol fuel electric system as per technical specifications Activity: Organize the students in manageable groups to rectify different petrol fuel electric system faults. Also, encourage them to use the internet, manufacturers' manuals and library books to explore different modern	- Select tools, equipment and safety gear - Interpret fuel system electrical circuits - Inspect parts of petrol fuel electric system - Repair faulty parts of petrol fuel electric system components - Replace defective parts of petrol fuel electric system - Service circuits in petrol fuel electric system - Test petrol fuel electric system - Observe safety - Clean tools and equipment	system works as per the standards given by manufacturer	Method used: The student should explain: - How to rectify petrol fuel electric systems Principles: The student should explain the principles of: - Rectifying faults in petrol fuel electric systems - Testing petrol fuel electric system Theories: The student should explain: - Functions of different tools and equipment used to rectify faults of parts of petrol fuel electric system - Faults in petrol fuel electric system, causes and remedies Circumstantial knowledge: Detailed knowledge about:	are to be available: - Vehicle - Tool kit - Multi-meters - Test lamp - Overcoat - Diagnostic machines - 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	Services Assessment	Underpinning Knowledge		
			methods, tools and equipment for diagnosis and faulty findings	Store tools and equipment		- Safety precautions - Manufacture's service manual		
	6.2 Servicing diesel electric fuel systems	(a) Diagnosing Diesel Electric Fuel System	Brainstorm: Guide the students to Explain the meaning of diesel fuel electric system Describe the construction and operation of the diesel fuel electric system Practical Work: Guide the student on how to identify and locate faulty components of diesel fuel electric system Activity: Organize the students in manageable groups to diagnose diesel fuel electric system components and circuit faults	The student should be able to: - Select tools, equipment and safety gear - Interpret the circuit diagram - Identify and locate diesel electric fuel system components - Perform visual inspection of diesel-electric fuel system components - Test diesel electric fuel system components - Check all diesel electrical fuel system sensors	Diagnosed diesel electric fuel system faults are isolated as per technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to diagnose Diesel Electric Fuel System Principles: The student should explain the principles involved in diagnosing Diesel Electric Fuel System Theories: The student should explain: - Classifications of diesel electric fuel system - Components of diesel fuel electric systems - Types of diesel fuel electric systems - Diesel fuel electric systems - Modern technologies used	The following tools, equipment and safety gears are to be available: - Vehicle - Tool kit - Multi-meters - Test lamp - Overcoat - Diagnostic machines - Safety boots - Safety glass Gloves	36

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
				- Observe safety precautions - Clean tools and equipment - Store tools and equipment		in diesel electric systems especially emission controlling systems Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacturer's service manual		
		(b) Rectifying Diesel Fuel Electric System Faults	Brainstorm: Guide the students to identify possible causes of diesel fuel electric system faults Demonstration: Organize the students in manageable groups and demonstrate to them how to use different tools and equipment to rectify different diagnosed faults of diesel fuel electric system as per	The student should be able to: - Select tools, equipment and safety gear - Interpret the circuit diagram - Inspect and check diesel fuel electric components - Repair faulty diesel fuel electric components - Replace defective diesel	Rectified diesel fuel electric system works as per standards given by manufacturer	Knowledge evidence: Detailed knowledge of: Method used: The student should explain: - How to rectify diesel fuel electric system Principles: The student should explain the principles involved in rectifying Diesel Fuel Electric System Faults Theories: The student should explain: - Diagnostic procedure for rectifying diesel	The following tools, equipment and safety gears are to be available: - Vehicle - Tool kit - Multi-meters - Test lamp - Overcoat - Diagnostic machines - 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	Services Assessment	Underpinning Knowledge		
			technical specifications Activity: Organize the students in manageable groups to rectify different diesel fuel electric system faults	fuel electric components - Check all diesel electrical fuel system sensors - Test the diesel fuel electric system - Observe safety precautions - Clean tools and equipment - Store tools and equipment		fuel electric systems - Faults in diesel fuel electric systems, causes and remedies Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual		
7.0 Maintaining emission control system	7.1 Servicing catalytic converter	(a) Inspecting catalytic converter	Brainstorm: Guide the students to Define the terms related to emission control systems Identify different emission control systems Explain the meaning of catalytic converter Identify procedures for inspecting catalytic converter Practical Work:	The student should be able to: - Select tools, equipment and safety gear - Use service manual - Perform visual inspection of catalytic converter components - Check and test catalytic	The catalytic converter is inspected as per manufacturer's service manual	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: Inspect and check the catalytic converter Principles: The student should explain the principles involved in inspecting catalytic converter Theories: The student should explain: -	The following tools, equipment and safety gears are to be available: - Service Manual - Tool kit - Pipe cutter - Air compressor - Exhaust gas analyzer	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	Services Assessment	Underpinning Knowledge		
			Guide the student on how to identify and locate components of catalytic converter Activity: Organize the students in manageable groups to inspect catalytic converter and locate faulty components	converter components - Clean tools, equipment and workplace - Store tools and equipment		- Meaning of catalytic converter - Functions of catalytic converter - Types of catalytic converter - Importance of catalytic converter - Modern technologies related to catalytic converters Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual book - Globe automotive emission standards	- Overall - Safety boot - Gloves - Safety clear glasses	
		(b) Repairing catalytic converter	Discussion: Guide the students to discuss Possible faults and causes of catalytic converter	The student should be able to: Select tools equipment and safety gear	Repaired catalytic converter conforms to the manufacturer'	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: Check catalytic converter	The following tools, equipment and safety gears are to be available: 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	Services Assessment	Underpinning Knowledge		
			Activity: Organize the students in manageable groups to repair catalytic converter faults. Also, encourage them to use the internet, manufacturers' manuals and library books to explore more information.	- Use the service manual - Check catalytic converter - Repair faulty catalytic converter components - Test catalytic converter - Replace defective catalytic converter - Clean tools, equipment and workplace - Store tools and equipment	service manual	- Repair catalytic converter Principles: The student should explain the principle involved in repairing catalytic converter Theories: The student should explain: - - Procedures for repairing catalytic converter - Importance of repairing catalytic converter Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacturer's service manual	- Tool kit - Pipe cutter - Air compressor - Exhaust gas analyzer - Overall - Safety boot - Gloves - Safety clear glasses	
	7.2 Servicing oxygen sensor	(a) Inspecting oxygen sensor	Brainstorm: Guide the students to explain the oxygen sensor Practical Work:	The student should be able to: - Select tools equipment and safety gear - Use service manual	Oxygen sensor is inspected as per manufacturer's service manual	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to Inspect oxygen sensor	The following tools, equipment and safety gears are to be available: Service Manual	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	Services Assessment	Underpinning Knowledge		
			Guide the student on how to identify and locate oxygen sensor and its circuit Activity: Organize the students in manageable groups to inspect oxygen sensor and its circuit	- Identify and locate oxygen sensor - Perform visual inspection of the oxygen sensor - Identify the terminals of oxygen sensors - Check oxygen sensor and its circuit - Testing oxygen sensor - Clean tools, equipment and work place - Store tools and equipment		Principles: The student should explain the principle involved in checking oxygen sensor Theories: The student should explain: - - Function of oxygen - Importance of cleaning oxygen sensor - Types of oxygen sensors Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacturer's service manual	- Tool kit - Multimeter - Scan tool - Torque wrench - Air compressor - Overall - Safety boot - Gloves - Safety clear glasses	
		(b) Replacing an oxygen sensor	Discussion: Guide the students to discuss Possible oxygen sensor faults and their causes	The student should be able to: - Select tools and equipment - Use the service manual	Serviced Oxygen sensor as per manufacturer's service manual	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: - Replace oxygen sensor - Test oxygen sensor	The following tools, equipment and safety gears are to be available:	- Vehicle - 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	Services Assessment	Underpinning Knowledge		
			Demonstration: Organize the students in manageable group and demonstrate how to inspect faults of oxygen sensor Activity: Organize the students in manageable groups to replace faulty oxygen sensor	- Check oxygen sensor - Service the oxygen sensor circuit - Replacing oxygen sensor - Testing oxygen sensor - Clean tools, equipment and work place - Store tools and equipment		Principles: The student should explain the principles involved in replacing or repairing oxygen sensor Theories: The student should explain: - - Procedures for inspecting oxygen sensor - Importance of cleaning oxygen sensor - Sensor faults, causes and remedies Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual	- Tool kit - Multimeter - Scan tool - Torque wrench - Air compressor - Overall - Safety boot - Gloves - Safety clear glasses	
	7.3 Servicing muffler and pipes	(a) Diagnosing muffler and pipes	Brainstorm: Guide the students to use library books and internet to	The student should be able to: Select tools, equipment and safety gear	Diagnosed muffler and pipes faults are isolated serviced as per	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to diagnose the muffler and pipes	The following tools, equipment and safety gears are to be available: Vehicle	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	Services Assessment	Underpinning Knowledge		
			Define the terms related to exhaust muffler and pipes Describe the functions of muffler and pipes Identify possible faults of muffler and pipes Practical Work: Guide the student on how to identify and locate leakage in muffler and pipes Activity: Organize the students in manageable groups to diagnose faults of muffler and pipes	• Use the service manual • Identify and locate muffler and pipes • Inspect muffler and pipes • Check and test leakages and damages of muffler and pipes • Clean tools, equipment and work place • Store tools and equipment	manufacturer's service manual	exhaust system components Principles: The student should explain the principles involved in diagnosing muffler and pipes Theories: The student should explain: - • Meaning and functions of muffler and pipes • Construction and operation of muffler and pipes • Modern technologies incorporated to muffler and pipes Circumstantial knowledge: Detailed knowledge about: • Safety precautions • Manufacture's service manual book • Globe automotive emission standards	• Service Manual • Tool kit • Multimeter • Scan tool • Torque wrench • 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	Services Assessment	Underpinning Knowledge		
		(b) Rectifying exhaust muffler and pipes	Discussion: Guide the students to discuss Possible muffler and pipes faults and their causes Demonstration: Organize the students in manageable and demonstrate how to use different tools and equipment for rectifying faulty muffler and pipes Activity: Organize the students in manageable groups to replace faulty muffler and pipes	The student should be able to: • Select tools, equipment and safety gear • Use the service manual • Inspect muffler and pipes • Check and test leakages and damages of muffler and pipes • Repair faulty mufflers and pipes • Repair defective mufflers and pipes • Clean tools, equipment and workplace • Store tools and equipment	Rectified exhaust muffler and pipes operate as per technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to rectify exhaust muffler and pipes Principles: The student should explain the principles involved in rectify exhaust muffler and pipes Theories: The student should explain:- • Procedures for rectifying muffler and pipes • Exhaust muffler and pipes faults, causes and remedies Circumstantial knowledge: Detailed knowledge about: • Safety precautions • Manufacture's service manual book	The following tools, equipment and safety gears are to be available: • Vehicle • Service Manual • Tool kit • Multimeter • Scan tool • Torque wrench • 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	Services Assessment	Underpinning Knowledge		
						Globe automotive emission standards		
	7.4 Servicing exhaust gas recirculation valve (EGR)	(a) Diagnosing exhaust gas recirculation (EGR) valve	Brainstorm: Guide the students to use library books and internet to explain the Exhaust Gas Recirculation system (EGR) Practical Work: Guide the student on how to identify and locate faulty exhaust gas recirculation (EGR) valve Activity: Organize the students in manageable groups to diagnose faults of exhaust gas recirculation (EGR) valve	The student should be able to: - Select tools, equipment and safety gear - Use the service manual - Identify and locate the EGR valve - Inspect and check the EGR valve - Test components of the exhaust system - Observe safety precautions - Clean tools, equipment and workplace - Store tools and equipment	Diagnosed Exhaust gas recirculation valve faults are isolated as per manufacturer's service manual	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to diagnose exhaust gas recirculation valve components Principles: The student should explain the principles involved in diagnosing exhaust gas recirculation valve components Theories: The student should explain: - - Meaning of exhaust gas recirculation valve - Construction and operation of exhaust gas recirculation valve - Types of exhaust gas recirculation valve	The following tools, equipment and safety gears are to be available: - Vehicle - Service Manual - Tool kit - Multimeter - Scan tool - Torque wrench - Air compressor - Overall - Safety boot - Gloves - Safety clear glasses	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	Services Assessment	Underpinning Knowledge		
						- Importance of exhaust gas recirculation valve Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacturer's service manual book - Globe automotive emission standards		
		(b) Rectifying exhaust gas recirculation valve	Discussion: Guide the students to discuss Possible exhaust gas recirculation (EGR) valve faults and their causes Demonstration: Organize the students in manageable and demonstrate how to use different tools and equipment for	The student should be able to: - Select tools, equipment and safety gear - Use service manual - Diagnose EGR valve - Repair EGR valve - Replace EGR valve components	Exhaust gas recirculation valve serviced as per manufacturer's service manual	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: - service exhaust gas recirculation valve components - Replace exhaust gas recirculation valve components - Test exhaust gas recirculation valve Principles: The student should explain the	The following tools, equipment and safety gears are to be available: - Vehicle - Service Manual - Tool kit - Multimeter - Scan tool - Torque 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	Services Assessment	Underpinning Knowledge		
			rectifying exhaust gas recirculation (EGR) valve Activity: Organize the students in manageable groups to rectify exhaust gas recirculation (EGR) valve faults	- Test performance of exhaust system - Observe safety precautions - Clean tools, equipment and work place Store tools and equipment		principals involved in rectifying exhaust gas recirculation valve Theories: The student should explain: - - Procedures for rectifying EGR components - Possible EGR faults causes and remedies Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual book - Globe automotive emission standards	- Air compressor - Overall - Safety boot - Gloves - Safety clear glasses	
8.0 Maintaining display panel instruments	8.1 Serving panel gauges	(a) Serving gauge units	Discussion: Guide the students to use library books and internet to discuss Definition of the terms related to	The student should be able to: Select tools, equipment and safety gear	Serviced panel gauge units function as per technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to diagnose and rectify panel gauges	The following tools, equipment and safety gears are to be available: - Vehicle - Tool kit	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	Services Assessment	Underpinning Knowledge		
			display panel instruments Identify possible faults of display gauges and their causes Practical Work: Guide the student on how to diagnose and locate faulty gauge units Activity: Organize the students in manageable groups to service gauge units	• Interpret panel gauges unit's circuits • Diagnose panel gauge units' faults • Rectify panel gauge components • Test panel gauge system • Observe safety • Clean tools and equipment • Store tools and equipment		Principles: The student should explain principles involved in Serving gauge units Theories: The student should explain: • Types of panel gauges • Applications of panel gauges • Functions, of display panel instruments • Faults of panel gauges, causes and remedies Circumstantial knowledge: Detailed knowledge about: • Safety precautions • Manufacture's service manual book	• Multimeter • Test lamp • Soldering gun • Overcoat • Safety boots • Safety glass	
		(b) Serving sender units	Discussion: Guide the students to discuss The meaning of sender unit	The student should be able to: • Select tools, equipment and safety gear	Serviced sender units function as per technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain	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	Services Assessment	Underpinning Knowledge		
			The functions of sender unit Possible sender unit faults and their causes Demonstration: Organize the students in manageable and demonstrate how to use different tools check and inspect the circuit of sender unit Activity: Organize the students in manageable groups to service sender unit	- Interpret panel sender unit's circuits - Diagnose panel sender unit's faults - Rectify sender unit's components - Test sender units' system - Observe safety - Clean tools and equipment - Store tools and equipment		how to diagnose and rectify sender units Principles: The student should explain principles involved in Serving sender units Theories: The student should explain: - Types of sender units - Applications of panel sender unit - Faults of sender units, causes and remedies Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual book	- Vehicle - Tool kit - Multimeter - Test lamp - Soldering gun - Overcoat - Safety boots - Safety glass	
	8.2 Servicing panel light systems	(a) Troubles hooting panel light system	Discussion: Guide the students to use library books and internet to discuss	The student should be able to: Select tools, equipment and safety gear	Troubleshoot ed ed panel light system functions as per	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to troubleshoot panel light systems	The following tools, equipment and safety gears are to be available: Vehicle	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	Services Assessment	Underpinning Knowledge		
			Definition of the terms related to light systems Describe the functions, of light systems Identify possible faults of display gauges and their causes Demonstration: Organize the students in manageable groups and demonstrate how to diagnose faults of panel light system Activity: Organize the students in manageable groups to rectify faults of panel light system	- Interpret panel light circuits - Diagnose panel light faults - Rectify faulty components of panel light system - Test panel light system - Observe safety - Clean tools and equipment - Store tools and equipment	manufacturers specifications	Principles: The student should explain principles involved in troubleshooting panel light system Theories: The student should explain: - Types of panel lights - Purpose of panel lights in a vehicle - Faults in panel light systems, causes and remedies Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual book	- Tool kit - Multimeter - Test lamp - Soldering gun - Overcoat - 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	Services Assessment	Underpinning Knowledge		
		(b) Replacing panel light system sensors	Brainstorm: Guide the students to Identify different panel light system sensors and their function Possible panel light system sensors faults and their causes Practical work: Organize the students in manageable to use different tools and equipment to diagnose panel light system sensors Activity: Organize the students in manageable groups replace panel light system sensors	The student should be able to: - Select tools, equipment and safety gear - Interpret panel light circuits - Check panel light sensors - Check panel light sensors circuit - Replace defective panel light sensors - Observe safety - Clean tools and equipment - Store tools and equipment	New fitted panel light sensors function as per manufacturers specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to check and replace panel light sensors Principles: The student should explain principles involved in replacing panel light system sensors Theories: The student should explain: - Meaning of panel light sensors - Types of panel light sensors - Purpose of panel lights sensors in a vehicle - Faults in panel light sensors systems, causes and remedies Circumstantial knowledge: Detailed knowledge about:	The following tools, equipment and safety gears are to be available: - Vehicle - Tool kit - Multimeter - Test lamp - Soldering gun - Overcoat - 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	Services Assessment	Underpinning Knowledge		
						- Safety precautions - Manufacture's service manual book		
	8.3 Servicing electronic speed meters	(a) Servicing electronic speed meters gauge units	Brainstorm: Guide the students to use library books and internet to Define the terms related to electronic speed meters Identify the components of electronic speed meters Describe the functions, of electronic speed meters Describe the functions of speed meters gauge units Identify possible faults of speed meters gauge units Demonstration: Organize the students in manageable groups	The student should be able to: - Select tools, equipment and safety gear - Interpret electronic speed meters gauges unit's circuits - Diagnose electronic speed meters gauge units' faults - Rectify electronic speed meters gauge components - Test electronic speed meters gauge system - Observe safety - Clean tools and equipment	Serviced electronic speed meters gauge units function as per technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to diagnose and rectify electronic speed meters gauges Principles: The student should explain principles involved in servicing electronic speed meters gauge units Theories: The student should explain: - Types of electronic speed meters gauges - Applications of electronic speed meters gauges - Faults of electronic speed meters gauges, causes and remedies	The following tools, equipment and safety gears are to be available: - Vehicle - Tool kit - Multimeter - Test lamp - Soldering gun - Overcoat - Safety boots Safety glass	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	Services Assessment	Underpinning Knowledge		
			and demonstrate how to inspect the circuits of speed meter gauge units, Diagnose faults of speed meter gauge units Activity: Organize the students in manageable groups to service speed meter gauge units	Store tools and equipment		Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual book		
		(b) Servicing electronic speed meter gear units	Discussion: Guide the students to discuss Functions of speed meter gear units Possible speed meter gear units' faults and their causes Practical work: Organize the students in manageable to use different tools and equipment to	The student should be able to: - Select tools, equipment and safety gear - Interpret gear units' circuits - Diagnose gear units' faults - Rectify sender unit's components - Test gear units' system - Observe safety	Serviced gear units function as per technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to diagnose and rectify gear units Principles: The student should explain principles involved in servicing electronic speed meter gear units Theories: The student should explain:	The following tools, equipment and safety gears are to be available: - Vehicle - Tool kit - Multimeter - Test lamp - Soldering gun - Overcoat - 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	Services Assessment	Underpinning Knowledge		
			diagnose speed meter gear units Activity: Organize the students in manageable groups service speed meter gear units	- Clean tools and equipment - Store tools and equipment		- Types of electronic speed meter gear units - Applications of electronic speed meter gear units - Faults of electronic speed meter gear units, causes and remedies Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual book		
	8.4 Servicing tachometer systems	(a) Servicing tachometer gauge units	Brainstorm: Guide the students to use library books and internet to Define tachometer and tachometer gauge units Identify the function of tachometer Identify possible faults of tachometer	The student should be able to: - Select tools, equipment and safety gear - Interpret tachometer gauges unit's circuits - Diagnose tachometer	Serviced tachometer gauge units function as per technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to diagnose and rectify tachometer gauges Principles: The student should explain principles of:	The following tools, equipment and safety gears are to be available: - Vehicle - Tool kit - Multimeter - Test lamp	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	Services Assessment	Underpinning Knowledge		
			gauge units and their causes Demonstration: Organize the students in manageable groups and demonstrate how to inspect the circuits of tachometer gauge units, Diagnose faults of tachometer gauge units Activity: Organize the students in manageable groups to service tachometer gauge units	gauge units' faults - Rectify tachometer gauge components - Test tachometer gauge system - Observe safety - Clean tools and equipment - Store tools and equipment		- Operation of tachometer gauges Theories: The student should explain: - Types of tachometer gauges - Applications of tachometer gauges - Faults of tachometer gauges, causes and remedies Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual book	- Soldering gun - Overcoat - Safety boots - Safety glass	
		(b) Servicing tachometer circuits	Discussion: Guide the students to discuss Possible tachometer circuits faults and their causes	The student should be able to: - Select tools, equipment and safety gear - Interpret tachometer circuits	Serviced tachometer circuits function as per technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to diagnose and rectify tachometer circuit faults Principles: The student should explain	The following tools, equipment and safety gears are to be available: - Vehicle - Tool kit - Multimeter	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
			Practical work: Organize the students in manageable to use different tools and equipment to diagnose tachometer circuits Activity: Organize the students in manageable groups service tachometer circuits	- Diagnose tachometer circuit components faults - Rectify tachometer circuit faults - Test tachometer circuit performance - Observe safety - Clean tools and equipment - Store tools and equipment		principles involved in Servicing tachometer circuits Theories: The student should explain: - Construction of tachometer circuit - Faults of tachometer circuits, causes and remedies Circumstantial knowledge: Detailed knowledge about: - Safety precautions - Manufacture's service manual book	- Test lamp - Soldering gun - Overcoat - Safety boots Safety glass	

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	Services Assessment	Underpinning Knowledge		
1.0 Servicing electrical accessories	1.1 Servicing central door lock systems	(a) Diagnosing central door lock system	Group discussion: Guide students through manageable groups to discuss the concepts related to electrical accessories and central door lock system Practical work: Guide student to diagnose central door lock system Activity: Organize the students in manageable group to diagnose central door lock system	The student should be able to: - Select tools, equipment and safety gear - Check central lock door circuit - repair door lock circuit - Test door lock - Observe safety precautions - Clean tools, equipment and workplace - Store tools and equipment	Diagnosed central door lock system conforms to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to diagnose central door lock system Principles: The student should explain principles involved in diagnosing central door lock system Theories: The student should explain: - The concept of central door lock system - Operation of central door locks system - Possible faults in central door lock circuit Circumstantial knowledge Detailed knowledge about: - Safety precautions - Manufacturer's services manual book	The following tools, equipment and safety gears are to be available: - Vehicle - Electrical bench - Spanner kits - Screw driver set - Digital multimeter - Test lamp - Gloves - Safety boots - Safety glass - Overcoat	51
		(b) Rectifying central door lock circuit	Brainstorm: Guide students to brainstorm on	The student should be able to:	Rectified central door lock circuit	Knowledge evidence: Detailed knowledge of:	The following tools, equipment and 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	Services Assessment	Underpinning Knowledge		
			central door lock circuit Demonstration: Guide student to demonstrate how to diagnose faults in central door lock circuit Activity: Organize the students in manageable group to rectify central door lock circuit	- Select tools, equipment and safety gears - Interpret central door lock circuit - Check central lock door circuit - repair door lock circuit - Replace door lock components - Test door lock - Observe safety precautions - Clean tools, equipment and workplace - Store tools and equipment	conforms to technical specifications	Method used: The student should explain how to rectify central door lock circuit Principles: The student should explain principles involved in rectifying central door lock circuit Theories: The student should explain: - Operation of central door locks circuit - Faults in central door lock circuit, causes and remedies Circumstantial knowledge Detailed knowledge about: - Safety precautions - Manufacturer's services manual book	are to be available: - Vehicle - Electrical bench - Spanner kits - Screw driver set - Digital multimeter - Test lamp - Gloves - Safety boots - Safety glass - Overcoat	
		(c) Rectifyin g door lock actuators	Think-ink-pair-share: Guide students through	The student should be able to: Select tools, equipment	Rectified central door lock actuators	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to rectify central door lock actuator	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	Services Assessment	Underpinning Knowledge		
			think-ink-pair-share to explain door lock actuators Practical work: Guide students on to diagnose door lock actuators and locate faulty parts Activity: Organize the students in manageable group to repair or replace door lock actuator components	and safety gears • Check door lock actuators • repair door lock actuators • Replace door lock actuators components • Test door lock actuators • Observe safety precautions • Clean tools, equipment and workplace • Store tools and equipment	conforms to technical specifications	Principles: The student should explain principles of: rectifying central door lock actuator Theories: The student should explain: • Operation of central door locks actuator • Faults in central door lock actuator, causes and remedies Circumstantial knowledge Detailed knowledge about: • Safety precautions • Manufacturer's services manual book • Waste disposal	• Vehicle • Electrical bench • Spanner kits • Screw driver set • Digital multimeter • Test lamp • Gloves • Safety boots • Safety glass • Overcoat	
	1.2 Servicing power seat systems	(a) Diagnosing power seat system	Think-ink-pair-share: Guide students through think-ink-pair-share to explain	The student should be able to: • Select tools and equipment	Diagnosed power seat system conforms to manufacturer'	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to diagnose power seat systems	The following tools, equipment and safety gears are to be available: • Vehicle	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	Services Assessment	Underpinning Knowledge		
			the meaning of power seat system Practical work: Guide student to diagnose power seat system Activity: Organize the students in manageable group to diagnose power seat system	- Check faulty components - Test electric seat control - Observe safety precautions - Clean tools, equipment and workplace - Store tools and equipment	s specifications	Principles: The student should explain the principles involved in diagnosing power seat system Theories: The student should explain: - The concept of power seat system - Types of power seat system used in automobiles power seat motors - Faults in power seat motors, causes and remedies Circumstantial knowledge Detailed knowledge about: - Safety precautions - Manufacturer's services manual book - Waste disposal	- Electrical bench - Spanner kits - Screw driver set - Digital multimeter - Test lamp - Growler - Set of pliers - Over coat - Safety boots - Gloves - Safety glass	
		(b) Rectifying power seat components	Brainstorm: Guide students to brainstorm on procedures of rectifying power seat components Demonstration: Guide student to demonstrate how to perform visual inspection and	The student should be able to: - Select tools and equipment - Interpret power seat circuit - Check faulty components	Serviced power seat system conforms to manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to rectify power seat components Principles: The student should explain the principles involved in Rectifying power seat components Theories: The student should explain:	The following tools, equipment and safety gears are to be available: - Vehicle - Electrical bench - Spanner kits - Screw driver set	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
			test power seat components Activity: Organize the students in manageable group to diagnose power seat components	- Replace defective components - Test electric seat control unit - Observe safety precautions - Clean tools, equipment and workplace - Store tools and equipment		- Types of magnets used in automobiles - Faults in motors, causes and remedies Circumstantial knowledge Detailed knowledge about: - Safety precautions - Manufacturer's services manual book - Waste disposal	- Digital multimeter - OBD II tool - Test lamp - Growler - Set of pliers - Over coat - Safety boots - Gloves - Safety glass	
	1.3 Servicing power window systems	(a) Diagnosing power window circuits	Brainstorm: Guide students to brainstorm on possible faults of power window circuits Practical work: Guide student to identify and locate power window circuits Activity: Organize the students in manageable group to diagnose	The student should be able to: - Select tools and equipment - Check power window circuit - Identify faulty components of power window circuits	Diagnosed power window circuit functions as per maintenance manual book specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to service the power window circuit Principles: The student should explain the principles of: - Operation of power window circuits - Diagnosing power window circuits Theories: The student should explain: - The operations of power window circuit	The following tools, equipment and safety gears are to be available: - Vehicle - Electrical bench - Spanner kits - Screw driver set - Digital multimeter - Test lamp - Over coats	39

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
			power window circuits	- Test power window circuits - Observe safety precautions - Clean tools, equipment and workplace - Store tools, equipment and work place		- Faults power window circuit causes and remedies Circumstantial knowledge Detailed knowledge about: - Safety precautions - Manufacturer's services manual book - Waste disposal	- Gloves - Safety glass - Safety boots	
		(b) Rectifyin g faulty power window compone nts	Think-ink-pair-share: Guide students through think-ink-pair-share to identify faults of power window components Practical work: Guide student to repair or replace faulty power window components Activity: Organize the students in	The student should be able to: - Select tools and equipment - Rectify faulty components of power window - Repair or replace power window faulty components	Rectified power window components function as per standard and specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to rectify the power window components Principles: The student should explain the principles of: - Rectifying faulty power window components Theories: The student should explain: - Symptoms of faulty components of power window components Circumstantial knowledge Detailed knowledge about:	The following tools, equipment and safety gears are to be available: - Vehicle - Electrical bench - Spanner kits - Screw driver set - Digital multimeter - Test lamp - Over coats - Gloves - 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	Services Assessment	Underpinning Knowledge		
			manageable group to rectify faulty power window components	- Observe safety precautions - Clean tools, equipment and workplace - Store tools, equipment and work place		- Safety precautions - Manufacturer's services manual book - Waste disposal	Safety boots	
		(c) Repairing power window actuators	Think-ink-pair-share: Guide students through think-ink-pair-share to identify faults of power window actuators Practical work: Guide student to repair or replace fault power window actuators Activity: Organize the students in manageable group to rectify faulty power window actuators	The student should be able to: - Observe safety precautions - Select tools and equipment - Check power window actuators - Repair power window actuators - Clean tools, equipment and workplace - Store tools, equipment	Repaired power window actuators functions as per manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to repair the power window actuators Principles: The student should explain the principles of: - Operation of power window actuators - Repairing power window actuators Theories: The student should explain: - Types of power window actuators - Faults power window actuators causes and remedies Circumstantial knowledge Detailed knowledge about:	The following tools, equipment and safety gears are to be available: - Vehicle - Electrical bench - Spanner kits - Screw driver set - Digital multimeter - Test lamp - Over coats - Gloves - Safety glass - 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	Services Assessment	Underpinning Knowledge		
				and work place		• Safety precautions • Manufacturer's services manual book • Waste disposal		
	1.4 Servicing power mirror systems	(a) Diagnosing power mirror systems	Brainstorm: Guide students to brainstorm on faults of power mirror systems Demonstration: Guide student to demonstrate how to identify power mirror system faults Activity: Organize the students in manageable group to diagnose power mirror systems	The student should be able to: • Observe safety precautions • Select tools • Check the power mirror circuit • Test circuit • Clean tools, equipment and workplace • Store tools and equipment	Diagnosed power mirror system operates according to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: • Check power mirror circuits • Read faults of power mirror circuits Principles: The student should explain the principles of diagnosing power mirror circuits Theories: The student should explain: • The concept of the power mirror system • Function of power mirror circuit • Possible faults in power mirror circuits Circumstantial knowledge Detailed knowledge about: • Safety precautions while checking power mirror circuits • Safe handling of work tools and equipment • Proper waste disposal	The following tools, equipment and safety gears are to be available: • Vehicle • Electrical bench • Spanner kits • Digital multi-meter • Test lamp • Screw driver set • Over coat • Safety glass • Safety boots • Gloves	51

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
		(b) Rectifying power mirror system components	Demonstration: Guide students to brainstorm on functions of power mirror systems components Practical work: Guide student to rectify power mirror system components Activity: Organize the students in manageable group to rectify power mirror system components	The student should be able to: - Observe safety - Select tools - Replace power mirror system component - Repair power mirror system component - precautions - Clean tools, equipment and workplace - Store tools and equipment	Rectified power mirror system components operate as per technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: - Check power mirror system components - Clear faults of power mirror system components Principles: The student should explain the principles of: - Operation of power mirror system components - Rectifying power mirror system components Theories: The student should explain: - Function of power mirror components - Faults in power mirror components causes and remedies Circumstantial knowledge Detailed knowledge about: - Safety precautions - Manufacturer's services manual book - Waste disposal	The following tools, equipment and safety gears are to be available: - Vehicle - Electrical bench - Spanner kits - Digital multi-meter - OBD II Tester - Test lamp - Screw driver set - Over coat - Safety glass - 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	Services Assessment	Underpinning Knowledge		
	1.5 Servicing safety belt monitoring systems	(a) Diagnosing safety belt system	Think-ink-pair-share: Guide students through think-ink-pair-share to explain the concepts related to safety belts Demonstration: Guide students to demonstrate the procedures for diagnosing safety belt system Activity: Organize the students in manageable group to diagnose safety belt system	The student should be able to: - Observe safety precautions - Select tools and equipment - Check safety belt system - diagnose defective safety belt components - Test safety belt system - Clean tools, equipment and workplace - Store tools and equipment	Diagnosed safety belt system conforms to manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to diagnose safety belt systems Principles: The student should explain the principles involved in diagnosing safety belt systems Theories: The student should explain: - The concept of safety belt system - Components of safety belt system - Importance of safety belt systems - Types of Safety Belt Systems - Possible defects in safety belt system, causes and remedies Circumstantial knowledge Detailed knowledge about: - Safety precautions - Manufacturer's services manual book - Waste disposal	The following tools, equipment and safety gears are to be available: - Vehicle - Electrical bench - Spanner kits - Screw driver set - Digital multimeter - Test lamp - Over coat - Safety boots - Safety glass - Gloves	51
		(b) Repairing safety belt monitoring	Brainstorm: Guide students to brainstorm on possible faults of	The student should be able to:	Serviced belt system conforms to manufacturer's	Knowledge evidence: Detailed knowledge of:	The following tools, equipment and 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	Services Assessment	Underpinning Knowledge		
		g system components	safety belt monitoring system components Practical work: Guide students to diagnose the faults of safety belt monitoring system components Activity: Organize the students in manageable groups to repair or replace safety belt monitoring system components	- Observe safety precautions - Select tools and equipment - Rectify safety belt monitoring system components - Test safety belt monitoring system components - Clean tools, equipment and workplace - Store tools and equipment	s specifications	Method used: The student should explain how to service safety belt systems Principles: The student should explain the principles involved in servicing safety belt systems Theories: The student should explain: - Components of safety belt system - Types of safety belt systems - Function of safety belt system - Possible defects in safety belt system, causes and remedies Circumstantial knowledge Detailed knowledge about: - Safety precautions - Manufacturer's services manual book - Waste disposal	are to be available: - Vehicle - Electrical bench - Spanner kits - Screw driver set - Digital multimeter - Test lamp - Over coat - Safety boots - Safety glass - Gloves	
2.0 Maintaining electronic components	2.1 Servicing sensors	(a) Diagnosing sensors	Group Discussion: Guide students in groups to collaboratively describe the concepts related	The student should be able to: Observe safety precautions	Diagnosed sensors conform to technical standards	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to troubleshoot sensors Principles: The student should explain principles	The following tools, equipment and safety gears are to be available: - Vehicle - Electrical bench	36

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
			to electronics components and sensors Practical work: Guide student to read the faults codes related to sensors by using scan tool. Activity: Organize the students in manageable group to diagnose sensors	- Select tools and equipment - Check sensors - Replace faulty sensors - Test sensors - Clean tools equipment and work place - Store tools and equipment		involved in diagnosing sensors Theories: The student should explain: - Meaning of sensors - Function of sensors - Different types of sensors - Possible faults in sensors, cause and remedies Circumstantial knowledge Detailed knowledge about: - Safety precautions - Manufacturer's services manual book - Waste disposal	- Digital multi-meter - Car Scan tool - Spanner kits - Test lamp - Screw driver set - Overcoat - Safety glass - Safety boots - Gloves	
		(b) Rectifying faults of sensors	Brainstorm: Guide students to brainstorm on possible faults of sensors Demonstration: Guide students to demonstrate how to clear/erase fault codes by using the scan tool Activity: Organize the students in	The student should be able to: - Observe safety precautions - Select tools and equipment - Check sensors - Test sensors - Replace faulty sensors	Rectified sensors conform to technical standards	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to rectify faults of sensors Principles: The student should explain principles of rectifying faults of sensors Theories: The student should explain: - Function of sensors - Types of sensors - Possible faults in sensors, cause and remedies Circumstantial knowledge	The following tools, equipment and safety gears are to be available: - Vehicle - Electrical bench - Digital multi-meter - Scan tool - Spanner kits - 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	Services Assessment	Underpinning Knowledge		
			manageable groups to rectify faults in the sensors	• Clear fault codes by using the scan tool • Clean tools equipment and work place • Store tools and equipment		Detailed knowledge about: • Safety precautions • Manufacturer's services manual book • Waste disposal	• Screw driver set • Overcoat • Safety glass • Safety boots • Gloves	
	2.2 Servicing electronic control unit (ECU)	(a) Diagnosing ECU faults	Think-ink-pair-share: Guide students through think-ink-pair-share to explain the meaning of ECU as used in a vehicle Practical work: Guide students to identify and locate different circuits of ECU Activity: Organize the students in manageable groups to diagnose ECU	The student should be able to: • Observe safety precautions • Select tools and equipment • Check ECU • Replace faulty ECU • Test ECU • Clean tools equipment and work place • Store tools and equipment	Diagnosed ECU conforms to technical standards	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to diagnose ECU Principles: The student should explain principles of troubleshooting ECU faults Theories: The student should explain: • Function of ECU • Different types of ECU • Possible faults in ECU, cause and remedies Circumstantial knowledge Detailed knowledge about: • Safety precautions • Manufacturer's services manual book • Waste disposal	The following tools, equipment and safety gears are to be available: • Vehicle • Electrical bench • Digital multi-meter • Scan tool • Spanner kits • Test lamp • Screw driver set • Overcoat • Safety glass • Safety boots • Gloves	54

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
		(b) Rectifying ECU components	Brainstorm: Guide students to brainstorm on possible faults of ECU, their causes and remedies Demonstration: Guide student to demonstrate the procedures of repairing ECU components Activity: Organize the students in manageable groups to repair ECU components	The student should be able to: - Observe safety precautions - Select tools and equipment - Repair ECU component - Replace faulty ECU component - Test ECU component - Clean tools equipment and work place - Store tools and equipment	Rectified ECU components conform to technical standards	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to rectify ECU components Principles: The student should explain principles involved in rectifying ECU components Theories: The student should explain: - Function of sensors - Different types of ECU components Possible faults in sensors, cause and remedies Circumstantial knowledge Detailed knowledge about: - Safety precautions - Manufacturer's services manual book - Waste disposal	The following tools, equipment and safety gears are to be available: - Vehicle - Electrical bench - Digital multi-meter - Scan tool - Spanner kits - Test lamp - Screw driver set - Overcoat - Safety glass - Safety boots - Gloves	
3.0 Maintaining safe work environment	3.1 Managing hazards	(a) Controlling mechanical hazards	Discussion: Guide students in groups to describe the concepts related to safe work environment and hazards Demonstration:	The student should be able to: - Select tools and equipment - Use OSHA rules and regulations	Mechanical hazards controlled according to OSHA's rules and regulations	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to control mechanical hazards Principles: The student should explain the principles involved in controlling mechanical hazards	The following tools, equipment and safety gears are to be available: - Electrical equipment - Mechanical equipment	112

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
			Guide student to demonstrate how to control mechanical hazards Activity: Organize the students in manageable group to apply methods and techniques of controlling mechanical hazards in school workshop or premises	• Prepare workshop inspection report • Prepare workshop color code and safety signs • Identify mechanical hazard materials • Handle mechanical hazards material • Prepare preventive maintenance schedule • Identify and apply all emergency equipment and supplies • Conduct safety awareness training to sub-ordinates about		Theories: The student should explain: - • Function of inspection check list related to mechanical hazards • Importance of posting warning sign and safety instructions related to mechanical hazards • Advantages of risk assessment • Importance of carry out accident investigation • Importance of controlling mechanical hazards Circumstantial knowledge Detailed knowledge about: • OSHA's rules and regulations • Safety precautions • Manufacturer's services manual book • Waste disposal	• Power machines • Measuring tools • Cutting tools • First aid kit • Fire extinguishers • Service manuals • OSHA rules and regulations • Helmet • Gloves • Ear plug • Mask • 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	Services Assessment	Underpinning Knowledge		
				controlling mechanical hazards • Monitor safety environment • Manage uses of safety gears • Cleaning tools and equipment • Storing tools and equipment				
		(b) Controlling chemical hazards	Think-ink-pair-share: Guide students through think-ink-pair-share to define, identify methods and techniques of controlling chemical hazards Practical work: Guide student on how to control chemical hazards Activity: Organize the students in	The student should be able to: • Use OSHA rules and regulations • Select tools and equipment • Prepare workshop inspection report • Prepare workshop color code	Chemical hazards controlled according to OSHA's rules and regulations	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to control chemical hazards Principles: The student should explain the principles involved in controlling chemical hazards Theories: The student should explain: - • Function of inspection check list related to chemical hazards • Importance of posting warning sign and safety	The following tools, equipment and safety gears are to be available: • Electrical equipment • Chemical equipment • Power machines • Measuring tools • Cutting tools • First aid kit • Fire extinguishers	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
			manageable group to apply methods and techniques of controlling chemical hazards in school workshop or premises	and safety signs - Identify chemical hazard materials - Handle chemical hazards material - Prepare preventive maintenance schedule - Identify and apply all emergency equipment and supplies - Conduct safety awareness training to sub-ordinates about controlling chemical hazards - Monitor safety environment		instructions related to chemical hazards - Advantages of risk assessment - Importance of carry out accident investigation - Importance of controlling chemical hazards Circumstantial knowledge Detailed knowledge about: - OSHA's rules and regulations - Safety precautions - Waste disposal	- Service manuals - OSHA rules and regulations - Helmet - Gloves - Ear plug - Mask - 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	Services Assessment	Underpinning Knowledge		
				• Manage uses of safety gears • Cleaning tools and equipment • Storing tools and equipment				
		(c) Controlling Physical hazards	Brainstorm: Guide students to brainstorm on physical hazards Demonstration: Guide students to demonstrate how to apply methods and techniques of controlling physical hazards Activity: Organize the students in manageable group to apply methods and techniques of controlling physical hazards in school	The student should be able to: • Select tools and equipment • Use OSHA rules and regulations • Prepare workshop inspection report • Prepare workshop color code and safety signs • Identify physical hazard materials	Physical hazards controlled according to OSHA's rules and regulations	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to control Physical hazards Principles: The student should explain the principles involved in controlling Physical hazards Theories: The student should explain: - • Function of inspection check list related to physical hazards • Importance of posting warning sign and safety instructions related to physical hazards • Advantages of risk assessment • Importance of carry out accident investigation	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	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
			workshop or premises	• Handle physical hazards material • Prepare preventive maintenance schedule • Identify and apply all emergency equipment and supplies • Conduct safety awareness training to sub-ordinates about controlling physical hazards • Monitor safety environment • Manage uses of safety gears • Cleaning tools and equipment		• Importance of controlling physical hazards Circumstantial knowledge Detailed knowledge about: • OSHA's rules and regulations • Safety precautions • Waste disposal	• Helmet • Gloves • Ear plug • Mask • 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	Services Assessment	Underpinning Knowledge		
				Storing tools and equipment				
	3.2 Carrying out risk assessment	(a) Controlling risk	Think-ink-pair-share: Guide students through think-ink-pair-share to explain different risk Demonstration: Guide students to demonstrate how to apply methods and techniques to control risks Activity: Organize the students in manageable groups to control risk in school workshops or premises	The student should be able to: - Select tools and equipment - Interpret service manuals - Supervise practice safe workshop practices to protect yourself, others and properties - React correctly and safely when faced with an emergency - Identify and apply correctly all emergency equipment and supplies	Risk controlled as per OSHA standard and automobile regulations	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: - Eliminate the hazard - Evaluate the risk - Estimate the risk - Introduce a safe system of work - Provision of PPE Principles: The student should explain the principles involved in controlling risk Theories: The student should explain: - - Carryout risk assessment - Conducting safety training - Inspecting workshop areas tools and equipment - Handling Hazard material correctly - Follow compressed air rules Circumstantial knowledge Detailed knowledge about: - First aid	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	74

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
				• Make periodic inspections of workshop area and all equipment and prepare report • Conduct safety training • Identify any safety hazard material • Handle hazard material correctly • Prepare universal workshop color codes and know what the color represents • Make out and file safe report • Be aware of the dangerous of		• OSHA's rules and regulations • Safety precautions • Waste disposal		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
				compressed air • Ensure availability of personal protective equipment • Supervise compressed air rules • Monitor good environmental practices • Clean tools and equipment • Store tools and equipment				
		(b) Managing safety gears	Brainstorm: Guide students to brainstorm on methods and techniques of managing safety gears Practical work: Guide student to manage safety gears	The student should be able to: • Select tools and equipment • Supervise safe workshop practices to protect yourself,	Managed safety gears conform to OSHA standard and regulations	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: • Take inventory • Inspect and Manage safety gears Principles: The student should explain the principles involved in managing safety gears	The following tools, equipment and safety gears are to be available: • Service manuals • OSHA regulations • Workshop rules	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
			Activity: Organize the students in manageable group to apply methods and techniques of managing safety gears in the school workshop	other and properties - React correctly and safely when faced with an emergency - Make periodic inspections - Conduct safety training and Education - Make out and file safe report - Be aware of the dangerous of safety gears - Ensure availability of personal protective equipment - Clean tools and equipment - Store tools and equipment		Theories: The student should explain: - - Types of safety gears - Importance of managing safety gears - Conducting safety gears training Circumstantial knowledge Detailed knowledge about: - First aid - OSHA's rules and regulations - Safety precautions - Waste disposal	- Inventory form - Mask - Ear plug - 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	Services Assessment	Underpinning Knowledge		
	3.3 Managing environment	(a) Managing air pollution	Think-ink-pair-share: Guide students through think-ink-pair-share to identify methods and techniques for managing air pollution Scenario: Organize students in manageable groups and provide scenarios for them to investigate how to manage air pollution Activity: Organize the students in manageable group to apply methods and techniques of managing air pollution in school environment	The student should be able to: • Select relevant safety gears • Prepare a preventive maintenance schedule • Control environmental pollution • Managing workshop pollution • Control different types of wastes as per OSHA • Conduct safety awareness training to subordinates • Clean tools and equipment • Store tools and equipment	Managed air pollution conforms to rules and regulations	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to manage air pollution Principles: The student should explain the principles involved in managing air pollution Theories: The student should explain: - • Student should explain importance of managing air pollution • Explain types of air pollution • Advantages of monitoring air pollution • Importance of control different types of wastes Circumstantial knowledge Detailed knowledge about: • OSHA's rules and regulations • Safety precautions • Waste disposal	The following tools, equipment and safety gears are to be available: • Tool kit • Spirit level • Multimeter • Safety boots • Gloves • Overalls • Cleaning materials • Hoe • Broom • Brush • Safety gears • Dust covers • Dust mask • Dust bin	74

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
		(b)Managing water pollution	Brainstorm: Guide students to brainstorm on methods and techniques for managing water pollution Scenario: Organize students in manageable groups and provide scenarios for them to investigate how to manage water pollution Activity: Organize the students in manageable group to apply methods and techniques of managing water pollution in schools' environments	The student should be able to: • Select relevant safety gears • Prepare preventive maintenance schedule • Control environment pollution • Managing workshop pollution • Control different types of wastes as per OSHA • Conduct safety awareness training to subordinates • Clean tools and equipment • Store tools and equipment	Water pollution managed as per rules and regulations	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to manage water pollution Principles: The student should explain the principles of: • Managing water pollution • Handling environmental safety work • Preparing and conducting training • Handling different types of wastes Theories: The student should explain: - • Student should explain importance of managing water pollution • Explain types of water pollution • Advantages of monitoring water pollution • Importance of control different types of wastes Circumstantial knowledge Detailed knowledge about: • OSHA's rules and regulations • Safety precautions	The following tools, equipment and safety gears are to be available: • Tool kit • Sprit level • Multimeter • Safety boots • Gloves • Overalls • Cleaning materials • Hoe • Broom • Brush • Safety gears • Dust covers • Dust mask • 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	Services Assessment	Underpinning Knowledge		
						Waste disposal		
		(c) Managing land pollution	Brainstorm: Guide students to define, brainstorm on techniques for managing land pollution Scenario: Organize students in manageable groups and provide scenarios for them to investigate how to manage land pollution Activity: Organize the students in manageable group to apply methods and techniques of Managing land pollution	The student should be able to: - Select relevant safety gears - Prepare preventive maintenance schedule - Control land pollution - Managing workshop pollution - Control different types of wastes as per OSHA - Conduct safety awareness training to subordinates - Clean tools and equipment - Store tools and equipment	Land managed as per rules and regulations	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to manage land pollution Principles: The student should explain the principles involved in managing land pollution Theories: The student should explain: - - Student should explain importance of managing land pollution - Explain types of land pollution - Advantages of monitoring land pollution - Importance of control different types of wastes Circumstantial knowledge Detailed knowledge about: - OSHA's rules and regulations - Safety precautions - Waste disposal	The following tools, equipment and safety gears are to be available: - Tool kit - Sprit level - Multimeter - 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	Services Assessment	Underpinning Knowledge		
4.0 Managing preventive maintenance	4.1 Planning preventive maintenance	(a) Preparing schedules of preventive maintenance of tools, machines and equipment	Group Discussion: Guide students in groups to collaboratively describe the concepts related to preventive maintenance Demonstration: Guide student to demonstrate how apply methods and techniques for preparing schedules of preventive maintenance of tools and machines Activity: Organize the students in manageable group preparing schedules for preventive maintenance of school's workshop tools,	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 preventive maintenance programs • Prepare workshop	Preventive maintenance schedule Prepared as per workshop OSHA standards and regulations	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: • Prepare workshop inspection report • Plan and prepare workshop inventory • Plan and prepare preventive maintenance training Principles: The student should explain the principles of: • Reading and applying workshop rules and regulations • Preparing preventive maintenance schedule • Plan and prepare workshop inventory Theories: The student should explain: - • Importance of preparing workshop inspection and maintenance schedule reports • Importance of preparing maintenance training programs	The following tools, equipment and safety gears are to be available: • Workshop tools, equipment and machines • Service manuals • Workshop rules and regulations • Gloves • Overall • Safety boots • Safety clear glasses • Helmet • Mask • Ear plug	114

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
			machines and equipment	preventive maintenance schedule - Plan and Prepare workshop inventory - Clean tools and equipment - Store tools and equipment		- Importance of cleaning and storing tools and equipment Circumstantial knowledge Detailed knowledge about: - OSHA's rules and regulations - Safety precautions - Waste disposal		
		(b) Preparing inspection check list of tools, equipment and machine	Brainstorm: Guide students to brainstorm on check list of tools, equipment and machine Demonstration: Guide students to demonstrate how to apply methods and techniques for preparing the inspection checking list of tools, equipment and machines Activity:	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	Inspection check list prepared as per workshop OSHA standards and regulations	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: - Prepare workshop inspection report - Plan and prepare preventive maintenance training Principles: The student should explain the principles involved in preparing inspection checking list of tools, equipment and machine Theories: The student should explain: -	The following tools, equipment and safety gears are to be available: - Workshop tools, equipment and machines - Service manuals - Workshop rules and regulations - 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	Services Assessment	Underpinning Knowledge		
			Organize the students in manageable groups to prepare the inspection checking list of the school's workshop tools, equipment and machine	area and all equipment • Prepare workshop inspection report of tools and equipment • Plan and Prepare workshop inventory • Clean tools and equipment • Store tools and equipment		• Importance of preparing workshop inspection check list • Importance of preparing maintenance training programs • Importance of Cleaning and storing tools and equipment Circumstantial knowledge Detailed knowledge about: • OSHA's rules and regulations • Safety precautions • Waste disposal	• Safety boots • Safety clear glasses • Helmet • Mask • Ear plug	
	4.2 Supervising preventive maintenance	(a) Coordinating preventive maintenance of tools, equipment and machines	Think-ink-pair-share: Guide students through think-ink-pair-share to, explain preventive maintenance of coordinating preventive maintenance of tools Demonstration:	The student should be able to: • Interpret service manuals • Conduct workshop inspection report • Prepare and apply workshop preventive	Preventive maintenance of tools, equipment, machines and building are coordinated as per workshop standards	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: • Plan and conduct preventive maintenance training • Correct hand tools and equipment safety • Follow good environmental practices Principles: The student should explain the principles involved in coordinating	The following tools, equipment and safety gears are to be available: • General hand foot kit • Workshop tools, equipment and machines • Service manuals	108

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
			Guide students to demonstrate how to apply methods and techniques for coordinating preventive maintenance of tools Activity: Organize the students in manageable group to coordinate preventive maintenance of school's workshop, equipment and machines	maintenance schedule - Plan and conduct preventive maintenance training - Practice correct hand tools and equipment safety - Practice good electrical safety - Monitor good environmental practices - Clean tools and equipment - Store tools and equipment		preventive maintenance of tools, equipment and machines Theories: The student should explain: - - Importance of performing preventive maintenance Circumstantial knowledge Detailed knowledge about: - OSHA's rules and regulations - Safety precautions - Waste disposal	- Workshop rules and regulations - Gloves - Overall - Safety boots - Safety clear glasses - Helmet - Mask - Ear plug	
		(b) Performing preventive maintenance of the working	Brainstorm: Guide students to brainstorm on preventive maintenance of tools, equipment and machines	The student should be able to: Interpret service manuals	Preventive maintenance of tools, equipment, machines and building are performed as	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to performing preventive maintenance of working environment	The following tools, equipment and safety gears are to be available: General hand foot 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	Services Assessment	Underpinning Knowledge		
		environm ent	Demonstration: Guide students to demonstrate how to apply methods and techniques for performing preventive maintenance of the working environment Activity: Organize the students in manageable group to perform preventive maintenance of the working environment	• Read and apply rules and regulations • Prepare and apply workshop inspection report • Prepare and use safety signs and color code • Prepare and apply workshop preventive maintenance schedule • Plan and conduct preventive maintenance training • Practice correct hand tools and equipment safety • Practice good electrical safety	per workshop standards	Principles: The student should explain the principles involved in performing preventive maintenance of working environment Theories: The student should explain: - • Importance of Planning and conducting preventive maintenance training • Importance of follow good environmental practices • Importance of Performing preventive maintenance of working environment Circumstantial knowledge Detailed knowledge about: • OSHA's rules and regulations • Safety precautions • Waste disposal	• 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	Services Assessment	Underpinning Knowledge		
				Clean tools and equipment • Store tools and equipment				
5.0 Carrying out engine management	5.1 Tuning up petrol fuel engines	(a) Diagnosing petrol engine faults	Group discussion: Guide students in groups to collaboratively describe the concepts related to engine maintenance and turn up Practical work: Guide students to diagnose and rectify petrol engine faults Activity: Organize the students in manageable groups to troubleshoot petrol engine faults	The student should be able to: • Select tools and equipment • Tune up petrol engine • Rectify electronic components • Test engine • Observe safety precautions • Clean tools, equipment and workplace • Store tools and equipment	Diagnosed petrol engine faults operate according to manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to tune up petrol fuel engine Principles: The student should explain the principles of tuning up petrol fuel engines Theories: The student should explain: • Difference between two stroke and four stroke operation cycle • Main parts of petrol fuel engine • Types of petrol fuel engines Circumstantial knowledge Detailed knowledge about: • First aid • Manufacturers service manual • Safety precautions • Waste disposal	The following tools, equipment and safety gears are to be available: • Petrol fuel vehicle • Electrical bench with petrol engine • Spanner kits • Digital multimeter • Oscilloscope • Test lamp • Screw driver set • Feeler gauge • Over coat • Gloves • Safety glass • Safety boot	88

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
		(b) Rectifying petrol engine faults	Brainstorm Guide the students to brainstorm on possible causes faults of petrol engines Practical work: Guide student to repair or replace petrol engine ignition and fuel system defective components Activity: Organize the students in manageable groups to rectify petrol engine ignition and fuel system defective components	The student should be able to: - Select tools and equipment - Rectify petrol engine components - Test engine - Observe safety precautions - Clean tools, equipment and workplace - Store tools and equipment	Repaired petrol engine operates according to manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to tune up petrol fuel engine Principles: The student should explain the principles of tuning up petrol fuel engines Theories: The student should explain: - Importance of tuning up petrol fuel engines - Main parts of petrol fuel system - Types of petrol fuel system - Faults in petrol engine, causes and remedies Circumstantial knowledge Detailed knowledge about: - First aid - Manufacturers service manual - Safety precautions - Waste disposal	The following tools, equipment and safety gears are to be available: - Petrol fuel vehicle - Electrical bench with petrol engine - Spanner kits - Digital multimeter - Oscilloscope - Test lamp - Screw driver set - Feeler gauge - Over coat - Gloves - Safety glass - Safety boots	
	5.2 Tuning up diesel fuel engines	(a) Diagnosing diesel engine faults	Think-ink-pair-share: Guide students through think-ink-pair-share to identify	The student should be able to: Select tools and equipment	Tuned up diesel engine operate according to manufacturer's	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to tune up diesel fuel engine	The following tools, equipment and safety gears are to be available:	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	Services Assessment	Underpinning Knowledge		
			possible diesel engine faults Practical work: Guide students to diagnose and rectify diesel engine faults using different tools and equipment Hands-on activities: Guide students in manageable groups through hands-on activities to diagnose diesel engine faults	• Tune-up diesel engine • Rectify electronic components • Test engine • Observe safety precautions • Clean tools, equipment and workplace • Store tools and equipment	s specifications	Principles: The student should explain the principles of tuning up diesel fuel engines Theories: The student should explain: • Difference between two stroke and four stroke operation cycle • Main parts of diesel fuel engine • Types of diesel fuel engines Circumstantial knowledge Detailed knowledge about: • First aid • Manufacturers service manual • Safety precautions • Waste disposal	• Diesel fuel vehicle • Electrical bench with diesel engine • Spanner kits • Digital multimeter • Oscilloscope • Test lamp • Screw driver set • Feeler gauge • Over coat • Gloves • Safety glass • Safety boots	
		(b) Repairing diesel engine faults	Brainstorm: Guide the students to brainstorm on possible causes of diesel engine faults Demonstration: Guide students to demonstrate how to repair or replace diesel	The student should be able to: • Select tools and equipment • Rectify diesel engine components • Test engine	The repaired diesel engine operates according to the manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to tune up diesel engine Principles: The student should explain the principles of tuning up diesel engines Theories: The student should explain: • Importance of tuning up diesel engines	The following tools, equipment and safety gears are to be available: • Diesel fuel vehicle • Electrical bench with diesel engine • Spanner kits	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
			engine system faulty components Hands-on activities: Guide students in manageable groups through hands-on activities to rectify diesel engine ignition and fuel system defective components	- Observe safety precautions - Clean tools, equipment and workplace - Store tools and equipment		- Main parts of diesel fuel system - Types of diesel fuel system - Possible faults in diesel engine, causes and remedies Circumstantial knowledge Detailed knowledge about: - First aid - Manufacturers service manual - Safety precautions - Waste disposal	- Digital multimeter - Oscilloscope - Test lamp - Screw driver set - Feeler gauge - Over coat - Gloves - Safety glass - Safety boots	
6.0 Maintaining automotive air condition system	6.1 Servicing automotive manual-controlled air conditioning systems	(a) Diagnosing automotive air condition system	Group discussion: Organize students in small groups and guide them to describe the concepts related to automotive air condition systems and identify possible faults in this system Practical Work: Guide the student to use different tools and	The student should be able to: - Select tools and equipment - Perform Visual Inspection of faulty components of air condition system - Check airflow and refrigerant	Diagnosed automotive air conditioning system conforms to manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to diagnose automotive air conditioning system Principles: The student should explain the principles of: - Operation of automotive air conditioning systems - Diagnosing of automotive air conditioning system Theories: The student should explain: - Heat and latent heat	The following tools, equipment and safety gears are to be available: - Vehicle - Electrical bench - Spanner kits - Digital multi-meter - Power supply - Screw driver set - Test lamp	61

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
			equipment to identify and faults of automotive air condition components Activity: Organize the students in manageable group to diagnose automotive air condition system components	Pressure Check • Test automotive air conditioning system operation • Observe safety precautions • Clean tools, equipment and workplace • Store tools and equipment		• Temperature and pressure relationship • Functions of automotive air Condition system components • Faults in automotive air condition system, causes and remedies Circumstantial knowledge Detailed knowledge about: • First aid • Manufacturers service manual • Safety precautions • Waste disposal	• Belt tension gauge • Over coat • Safety glass • Gloves • Safety boots	
		(b) Rectifying manual-controlled air condition system	Think-ink-pair-share: Guide students through think-ink-pair-share to identify the possible causes of air condition system faults Demonstration: Demonstrate to students on how	The student should be able to: • Select tools and equipment • Check manual controlled air conditioning system • Rectify faulty	Rectified manual controlled air conditioning system conforms to manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to rectify manual controlled air conditioning system Principles: The student should explain the principles involved in rectifying manual controlled air conditioning system Theories: The student should explain:	The following tools, equipment and safety gears are to be available: • Vehicle • Electrical bench • Spanner kits • Digital multi-meter • Power supply	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
			to repair and replace the faulty components of air condition system Activity: Organize the students in manageable group to rectify manual-controlled air condition system defective components	components of air condition system - Test air conditioning system - Observe safety precautions - Clean tools, equipment and workplace - Store tools and equipment		- importance of rectifying manual-controlled air condition system Circumstantial knowledge Detailed knowledge about: - First aid - Manufacturers service manual - Safety precautions - Waste disposal	- Screw driver set - Test lamp - Belt tension gauge - Over coat - Safety glass - Gloves - Safety boots	
		(c) Servicing automotive heating systems	Brainstorm: Guide the students to brainstorm on the construction, operation and possible faults of automotive heating system Practical work: Guide student on to use appropriate tool to check and repair automotive	The student should be able to: - Select tools and equipment - Check automotive heating systems - Rectify faulty components of automotive	Serviced automotive heating systems conform to the manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to service automotive heating systems Principles: The student should explain the principles involved in servicing automotive heating systems Theories: The student should explain: - automotive heating systems components - Types of automotive heating Systems	The following tools, equipment and safety gears are to be available: - Vehicle - Electrical bench - Spanner kits - Digital multi-meter - Power supply - Screw driver set	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
			heating systems components Activity: Organize the students in manageable groups to service automotive heating systems	heating systems • Test the operation of automotive heating systems • Observe safety precautions • Clean tools, equipment and workplace • Store tools and equipment		• Faults in automotive heating system, causes and remedies Circumstantial knowledge Detailed knowledge about: • First aid • Manufacturers service manual • Safety precautions • Waste disposal	• Test lamp • Belt tension gauge • Over coat • Safety glass • Gloves • Safety boots	
	6.2 Servicing automatic air conditioning systems	(a) Diagnosing automatic air conditioning systems	Think-ink-pair-share: Guide students through think-ink-pair-share to explain the meaning of automatic air conditioning and identify possible faults of this system Practical work:	The student should be able to: • Select tools and equipment • Perform Visual Inspection of faulty automatic air conditioning systems components	Diagnosed automatic air conditioning system operates according to manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to diagnose automatic air conditioning systems Principles: The student should explain the principles of: • Operation of automatic air conditioning system • diagnosing automatic air conditioning systems	The following tools, equipment and safety gears are to be available: • Vehicle • Electrical bench • Spanner kits • Screw driver set • Digital multimeter • Test lamp	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	Services Assessment	Underpinning Knowledge		
			Guide student to identify and locate the fault components of automatic air conditioning systems Activity: Organize the students in manageable group to diagnose automatic air conditioning systems components	Check automatic air conditioning systems components • Test automatic air conditioning systems operation • Observe safety precautions • Clean tools, equipment and workplace • Store tools and equipment		Theories: The student should explain: • Function of different automatic air condition components • Types of circuits of automatic air conditioning systems Circumstantial knowledge Detailed knowledge about: • First aid • Manufacturers service manual • Safety precautions • Waste disposal	• Tension gauge • Vacuum pump • Manifold gauge pressure set • Hydrometer • High rate discharge tester • Over coat • Safety glass • Safety boots • Gloves	
		(b) Rectifying automatic air conditioning components	Targeted questions: Guide students through targeted questions to explore the concepts and principles of identifying possible faults of	The student should be able to: • Select tools and equipment • Check automatic air conditioning components	Rectified automatic air conditioning components conform to the manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to rectify automatic air conditioning components Principles: The student should explain the principles rectifying involved in automatic air conditioning components	The following tools, equipment and safety gears are to be available: • Vehicle • Electrical bench • Spanner kits • Screwdriver set	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
			automatic air condition components Demonstration: Guide the student to demonstrate how to repair and replace faulty components of automatic air condition components Activity: Organize the students in manageable groups to rectify automatic air condition components	- Rectify faulty components of air conditioning components - Test air conditioning components - Observe safety precautions - Clean tools, equipment and workplace - Store tools and equipment		Theories: The student should explain: - The importance of rectifying automatic air conditioning components Circumstantial knowledge Detailed knowledge about: - First aid - Manufacturers service manual - Safety precautions - Waste disposal	- Digital Multimeter - Test lamp - Tension gauge - Vacuum pump - Manifold gauge pressure set - Hydrometer - High rate discharge tester - Over coat - Safety glass - Safety boots - Gloves	
		(c) Servicing Electronic Automatic Temperature Control (EATC)	Think-ink-pair-share: Guide students through think-ink-pair-share to describe the construction, operation and possible faults, causes and remedies of the electronic	The student should be able to: - Select tools and equipment - Check electronic automatic temperature control	Serviced electronic automatic temperature control (EATC) operates according to manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to service electronic automatic temperature control (EATC) Principles: The student should explain the principles related to servicing electronic automatic temperature control (EATC)	The following tools, equipment and safety gears are to be available: - Vehicle - Electrical bench - Spanner kits - Screw driver set	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
			automatic temperature control (EATC). Practical work: Guide students to diagnose faults of the Electronic Automatic Temperature Control (EATC) and isolate faulty components control Activity: Organize the students in manageable groups to repair or replace and service electronic automatic temperature control components	- Repair electronic automatic temperature control components - Test electronic automatic temperature control - Observe safety precautions - Clean tools, equipment and workplace - Store tools and equipment		Theories: The student should explain: - Types electronic automatic temperature control (EATC) - Faults in electronic automatic temperature control (EATC), causes and remedies Circumstantial knowledge Detailed knowledge about: - First aid - Manufacturers service manual - Safety precautions - Waste disposal	- Digital multimeter - Test lamp - Tension gauge - Vacuum pump - Manifold gauge pressure set - Hydrometer - High rate discharge tester - Over coat - Safety glass - Safety boots - Gloves	
	6.3 Maintaining on board refrigerators	(a) Recharging refrigerant	Think-ink-pair-share: Guide students through think-ink-pair-share to explain the concept and	The student should be able to: Select tools and equipment	Recharged refrigerator conforms to manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to service on board refrigerator Principles: The student should explain the principles	The following tools, equipment and safety gears are to be available: - Vehicle - Electrical bench	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	Services Assessment	Underpinning Knowledge		
			classification of refrigerants Practical work: Guide student on how to recharge refrigerant to onboard refrigerator Activity: Organize the students in manageable group to recharge refrigerant to onboard refrigerator in different vehicles	- Identify the refrigerant type - Check system performance - Evacuate the system - Recharge with the Correct amount - Observe safety precautions - Clean tools, equipment and workplace - Store tools and equipment		involved in servicing on board refrigerator Theories: The student should explain: - Heat, specific heat and latent heat - Temperature and pressure relationship - Components of refrigerator and their functions - Types of refrigerators and their functions - Faults in refrigerators causes and remedies Circumstantial knowledge Detailed knowledge about: - First aid - Manufacturers service manual - Safety precautions - Waste disposal	- Spanner kits - Screw driver set - Digital multimeter - Test lamp - Vacuum pump - Manifold gauge pressure set - Over coat - Safety boots - Gloves - Safety glass	
		(b) Repairing refrigerant leakage	Brainstorm: Guide the students to brainstorm on possible causes refrigerant leakages Practical work: Guide student on how to inspect	The student should be able to: - Select tools and equipment - Check faulty components of refrigerator	Repaired refrigerator conforms to manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to repair refrigerant leakage Principles: The student should explain the principles involved in repairing refrigerant leakage	The following tools, equipment and safety gears are to be available: - Vehicle - Electrical bench - Spanner kits	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
			and locate the leaking parts in the air conditioning system. Activity: Organize the students in manageable group to repair refrigerant leakage	• Replace defective components • Test refrigerator • Observe safety precautions • Clean tools, equipment and workplace • Store tools and equipment		Theories: The student should explain: • Importance of repairing refrigerant leakage • Leak Detection Methods Circumstantial knowledge Detailed knowledge about: • First aid • Manufacturers service manual • Safety precautions • Waste disposal	• Screw driver set • Digital multimeter • Test lamp • Vacuum pump • Manifold gauge pressure set • Over coat • Safety boots • Gloves • Safety glass	
7.0 Servicing chassis electronics and accessories systems	7.1 Servicing Anti- lock Brake System (ABS)	(a) Diagnosing ABS faults	Group Discussion: Guide students in groups to collaboratively describe the terms related to ABS Practical work: Guide the students to identify and locate different faulty Anti-lock Brake System (ABS) components Activity:	The trainee should be able to: • Select tools, equipment and safety gear • Identify and locate components of ABS • Inspect components of ABS • Check and identify	Diagnosed ABS faults are isolated according to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The trainee should explain how to diagnose anti-lock brake system by using different tools and equipment Principles: The trainee should explain principles involved in diagnosing anti-lock Brake System (ABS) Theories: The trainee should explain: • Meaning of Anti-lock Braking System	The following tools, equipment and safety gears are to be available: • Vehicle • Electrical bench • Spanner kits • Set of pliers • Digital multimeter • Scan tool • Test lamp • Screw driver set • Over coat	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	Services Assessment	Underpinning Knowledge		
			Organize the students in manageable groups to use different tools and equipment to diagnose faults of Anti-lock Brake System (ABS)	faulty ABS components • Read DTCs related to ABS by using scan tool • Observe safety precautions • Clean tools, equipment and workplace • Store tools and equipment		• Construction and operation of Anti-lock Braking System • Function of brakes • Types of brakes • Difference between ABS and other types of brakes • Modern technologies related to ABS including Traction control system, EBD... • Faults in ABS Circumstantial knowledge Detailed knowledge about: • First aid • Manufacturers service manual • Safety precautions • Waste disposal	• Safety boots • Safety glass • Gloves	
		(b) Rectifyin g ABS faults	Think-ink-pair-share: Guide students through think-ink-pair-share to discuss advantages of proper troubleshooting of ABS Demonstration: Demonstrate how to use different	The trainee should be able to: • Select tools, equipment and safety gear • Identify the faulty diagnosed components of ABS	Rectified anti-lock brake system functions according to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The trainee should explain how to rectify Anti-lock Brake System Principles: The trainee should explain principles involved in rectifying anti-lock brake system (ABS) Theories: The trainee should explain:	The following tools, equipment and safety gears are to be available: • Vehicle • Electrical bench • Spanner kits • Set of pliers • Digital multimeter	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
			tools and equipment to rectify ABS faults Activity: Organize the students in manageable groups to rectify different abs faults	- Repair faulty ABS components - Replace defective ABS components - Clearing abs faults codes - Test ABS operation - Observe safety precautions - Clean tools, equipment and workplace - Store tools and equipment		- Function of different tools and equipment for rectifying ABS faults - The meaning of ABS DTCs - Faults in ABS, causes and remedies Circumstantial knowledge Detailed knowledge about: - First aid - Manufacturers service manual - Safety precautions - Waste disposal	- Scan tool - Test lamp - Screw driver set - Over coat - Safety boots - Safety glass - Gloves	
		(c) Servicing automatic traction control system	Discussion: Guide students in groups to collaboratively describe the construction and operation of an automatic traction control system Demonstration:	The trainee should be able to: - Select tools equipment - Locate the automatic traction control components	Serviced automatic traction control system according to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The trainee should explain how to service automatic traction control system Principles: The trainee should explain principles involved in servicing automatic traction control system	The following tools, equipment and safety gears are to be available: - Vehicle - Electrical bench - Spanner kits - Set of 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	Services Assessment	Underpinning Knowledge		
			Organize the students in manageable groups and demonstrate how to inspect and diagnose faults of the automatic traction control system Activity: Organize the students in manageable groups to service automatic traction control system	• Check and inspect automatic traction control components • Diagnose fault automatic traction control components • Rectify automatic traction control components faults components • Test automatic traction control system operation • Observe safety precautions • Clean tools, equipment and workplace		Theories: The trainee should explain: • Meaning of automatic traction control system • Function automatic traction control system • Construction of automatic traction control system • Types of automatic traction control system • Faults in ABS, causes and remedies Circumstantial knowledge Detailed knowledge about: • First aid • Manufacturers service manual • Safety precautions • Waste disposal	• Digital multimeter • Scan tool • 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	Services Assessment	Underpinning Knowledge		
				Store tools and equipment				
	7.2 Servicing vehicle security systems	(a) Diagnosing security system faults	Think-ink-pair-share: Guide students through think-ink-pair-share to describe the concepts related to security systems. Practical work: Guide the students to identify and locate faulty security system components Activity: Organize the students in manageable groups to use different tools and equipment to diagnose faults of security system	The trainee should be able to: - Select tools, equipment and safety gear - Identify and locate components of security system - Inspect components of security system - Check and identify faulty security system components - Observe safety precautions - Clean tools, equipment	Diagnosed security system faults are isolated according to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The trainee should explain: - How to diagnose vehicle security systems - Diagnostic procedure of vehicle security system Principles: The trainee should explain the principles involved in diagnosing security system faults Theories: The trainee should explain: - Construction and operation of security system - Types of vehicle security systems - Advantages and disadvantages of vehicle security system - Diagnostic procedure of the system - Modern security systems Circumstantial knowledge Detailed knowledge about: - First aid	The following tools, equipment and safety gears are to be available: - Vehicle - Electrical bench - Spanner kits - Set of pliers - Digital multimeter - Scan tool - Test lamp - Screw driver set - Over coat - Safety boots - Safety glass - Gloves	14

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
				and workplace • Store tools and equipment		- Manufacturers service manual - Safety precautions - Waste disposal		
		(b) Rectifyin g security system compone nts faults	Brainstorm: Guide the students to brainstorm on possible causes of security system faults Demonstration: Demonstrate how to use different tools and equipment to rectify security system faults Activity: Organize the students in manageable groups to rectify different security system faults	The trainee should be able to: - Select tools, equipment and safety gear - Identify the faulty diagnosed components of security system - Repair faulty security system components - Replace defective security system components - Test security system operation	Rectified security system functions according to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The trainee should explain how to rectify security system faults Principles: The trainee should explain principles involved in rectifying security system Theories: The trainee should explain: - Function of different tools and equipment for rectifying security system faults - Faults in security system, causes and remedies Circumstantial knowledge Detailed knowledge about: - First aid - Manufacturers service manual - Safety precautions	The following tools, equipment and safety gears are to be available: - Vehicle - Electrical bench - Spanner kits - Set of pliers - Digital multimeter - Scan tool - 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	Services Assessment	Underpinning Knowledge		
				- Observe safety precautions - Clean tools, equipment and workplace - Store tools and equipment				
		(c) Servicing tracking system	Brainstorm: Guide the students brainstorm on the construction, operation and possible faults of automatic tracking system Demonstration: Organize the students in manageable groups and demonstrate how to inspect and diagnose faults of tracking system Activity: Organize the students in manageable	The trainee should be able to: - Select tools equipment - Locate the tracking system components - Check and inspect tracking system components - Diagnose fault tracking system components - Rectify tracking system components	Serviced tracking system functions according to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The trainee should explain: - How to diagnose vehicle tracking systems - Rectification procedure of vehicle tracking system Principles: The trainee should explain the principles involved in servicing tracking system Theories: The trainee should explain: - Construction and operation of tracking system - Types of vehicle security systems	The following tools, equipment and safety gears are to be available: - Vehicle - Electrical bench - Spanner kits - Set of pliers - Digital multimeter - Scan tool - 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	Services Assessment	Underpinning Knowledge		
			groups to service tracking system	faults components • Test automatic tracking system operation • Observe safety precautions • Clean tools, equipment and workplace • Store tools and equipment		• Advantages and disadvantages of vehicle tracking system • Diagnostic procedure of the system • Modern tracking system Circumstantial knowledge Detailed knowledge about: • First aid • Manufacturers service manual • Safety precautions		
	7.3 Servicing electronic suspension systems	(a) Diagnosing electronic suspension system	Think-ink-pair-share: Guide students through think-ink-pair-share to identify possible faults of electronic suspension system Practical work: Guide the students to identify and	The trainee should be able to: • Select tools equipment and safety gear • Interpret electronic suspension diagrams • Identify and locate components	Diagnosed electronic suspension components faults are isolated as per manufacturer's specifications	Knowledge evidence: Detailed knowledge of: Method used: The trainee should explain how to diagnose electronic suspension systems Principles: The trainee should explain the principles involved in • Diagnosing electronic suspension components • Inspecting electronic suspension system components	This element can be achieved at school workshop and the following tools, equipment and safety gears should be available • Vehicle • Service bench • Spanner kits • Screw driver set	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	Services Assessment	Underpinning Knowledge		
			locate different electronic suspension system components Activity: Organize the students in manageable groups to use different tools and equipment to diagnose faults of electronic suspension system	- of electronic suspension system • Check faulty components of electronic suspension system • Test electronic suspension system • Observe safety precautions • Clean tools, equipment and work place • Store tools and equipment		Theories: The trainee should explain: • meaning of electronic suspension system • Function of electronic suspension components • Construction and operations of electronic suspension system • Types of electronic suspension systems • Faults in suspension systems, Circumstantial knowledge Detailed knowledge about: • First aid • Manufacturers service manual • Safety precautions	• Set of pliers • Test lamp • Hydraulic jack • Digital • Multimeter • Over coat • Safety boots • Safety glass • Gloves	
		(b) Rectifying electronic suspension system components	Brainstorm: Guide the students brainstorm on Possible causes of electronic suspension system faults Demonstration:	The trainee should be able to: • Select tools, equipment and safety gear • Identify the faulty	Rectified electronic suspension system functions according to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The trainee should explain how to rectify electronic suspension system faults Principles: The trainee should explain principles	This element can be achieved at school workshop and the following tools, equipment and safety gears should be available • 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	Services Assessment	Underpinning Knowledge		
			Demonstrate how to use different tools and equipment to rectify electronic suspension system faults Activity: Organize the students in manageable groups to rectify different electronic suspension system faults	diagnosed components of electronic suspension system - Repair faulty electronic suspension system components - Replace defective electronic suspension system components - Test electronic suspension system operation - Observe safety precautions - Clean tools, equipment and workplace - Store tools and equipment		involved in rectifying electronic suspension system Theories: The trainee should explain: - Function of different tools and equipment for rectifying electronic suspension system faults - Faults in electronic suspension system, causes and remedies Circumstantial knowledge Detailed knowledge about: - First aid - Manufacturers service manual - Safety precautions	- Service bench - Spanner kits - Screw driver set - Set of pliers - Test lamp - Hydraulic jack - Digital - Multimeter - 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	Services Assessment	Underpinning Knowledge		
		(c) Servicing speed sensitive steering system	Brainstorm: Guide the students to brainstorm on construction, operation and possible faults of speed-sensitive steering system Demonstration: Organize the students in manageable groups and demonstrate how to inspect and diagnose faults of speed-sensitive steering Activity: Organize the students in manageable groups to service speed-sensitive steering system	The trainee should be able to: - Select tools equipment - Locate the speed sensitive steering system components - Check and inspect speed sensitive steering system components - Diagnose fault speed sensitive steering system components - Rectify speed sensitive steering system components faults components - Test speed sensitive	Serviced speed sensitive steering system functions according to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The trainee should explain: - How to diagnose vehicle speed sensitive steering systems - Rectification procedure of speed sensitive steering system Principles: The trainee should explain the principles involved in servicing speed sensitive steering system Theories: The trainee should explain: - Construction and operation of speed sensitive steering - Types of speed sensitive steering systems - Advantages and disadvantages of speed sensitive steering system - Diagnostic procedure of the system - Modern speed sensitive steering Circumstantial knowledge Detailed knowledge about: - First aid	This element can be achieved at school workshop and the following tools, equipment and safety gears should be available - Vehicle - Service bench - Spanner kits - Screw driver set - Set of pliers - Test lamp - Hydraulic jack - Digital - Multimeter - 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	Services Assessment	Underpinning Knowledge		
				steering system operation - Observe safety precautions - Clean tools, equipment and workplace - Store tools and equipment		- Manufacturers service manual - Safety precautions		
	7.4 Servicing electronic shift transmissions	(a) Diagnosing electronic shift transmissions faults	Think-ink-pair-share: Guide students through think-ink-pair-share to describe the construction operation and possible faults of electronic shift transmissions faults Practical work: Guide the students to identify and locate faulty components of	The trainee should be able to: - Select tools equipment and safety gear - Interpret electronic shift transmissions circuit diagrams - Identify and locate components of electronic shift	Diagnosed electronic shift transmission conforms to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The trainee should explain how to diagnose electronic shift transmissions Principles: The trainee should explain principles involved in diagnosing electronic shift transmission control system Theories: The trainee should explain: - Function of electronic shift transmission components - Types of electronic shift transmission	This element can be achieved at school workshop and the following tools, equipment and safety gears should be available - Vehicle - Service bench - Spanner kits - Screw driver set - Set of pliers - Test lamp - Hydraulic jack	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	Services Assessment	Underpinning Knowledge		
			electronic shift transmissions system components Activity: Organize the students in manageable groups to use different tools and equipment to diagnose faults of electronic shift transmissions system	transmissions system • Check faulty components of the electronic shift transmissions system • Reading fault codes related to electronic shift transmissions • Test electronic shift transmissions system • Observe safety precautions • Clean tools, equipment and work place • Store tools and equipment		• Faults in electronic shift transmission, Circumstantial knowledge Detailed knowledge about: • First aid • Manufacturers service manual • Safety precautions	• Digital • Multimeter • 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	Services Assessment	Underpinning Knowledge		
		(b) Rectifying electronic shift transmissions components	Discussion: Organize the students in manageable groups to discuss possible causes of electronic shift transmission faults and their remedies Demonstration: Demonstrate how to use different tools and equipment to rectify electronic shift transmission faults Activity: Organize the students in manageable groups to rectify different electronic shift transmissions faults	The trainee should be able to: - Select tools, equipment and safety gear - Identify the faulty diagnosed components of shift transmissions system - Repair faulty shift transmissions system components - Replace defective shift transmissions system components - Test shift transmissions system operation - Observe safety precautions	Rectified electronic shift transmissions functions according to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The trainee should explain how to rectify electronic shift transmissions Principles: The trainee should explain principles involved in rectifying electronic shift transmissions components Theories: The trainee should explain: - Function of different tools and equipment for rectifying electronic shift transmission components - Faults in electronic shift transmission, causes and remedies Circumstantial knowledge Detailed knowledge about: - First aid - Manufacturers service manual - Safety precautions - Waste disposal	This element can be achieved at school workshop and the following tools, equipment and safety gears should be available - Vehicle - Service bench - Spanner kits - Screw driver set - Set of pliers - Test lamp - Scan tool - Hydraulic jack - Digital - Multimeter - 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	Services Assessment	Underpinning Knowledge		
				- Clean tools, equipment and workplace - Store tools and equipment				
		(c) Servicing electronic cruise control system	Brainstorm: Guide the students brainstorm on electronic cruise control system and possible faults causes and remedies of electronic cruise control system Demonstration: Organize the students in manageable groups and demonstrate how to inspect and diagnose faults of electronic cruise control Activity: Organize the students in	The trainee should be able to: - Select tools equipment - Locate the electronic cruise control system components - Check and inspect electronic cruise control system components - Diagnose fault electronic cruise control system components - Rectify speed electronic	Serviced electronic cruise control steering system functions according to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The trainee should explain: - How to diagnose electronic cruise control steering systems - Rectification procedure of electronic cruise control system Principles: The trainee should explain the principles involved in servicing electronic cruise control system Theories: The trainee should explain: - Construction and operation of speed sensitive steering - Types of electronic cruise control systems - Advantages and disadvantages of	This element can be achieved at school workshop and the following tools, equipment and safety gears should be available - Vehicle - Service bench - Spanner kits - Screw driver set - Set of pliers - Test lamp - Hydraulic jack - Digital - Multimeter - Over coat - 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	Services Assessment	Underpinning Knowledge		
			manageable groups to service electronic cruise control system	cruise control system components faults components • Test electronic cruise control system operation • Observe safety precautions • Clean tools, equipment and workplace • Store tools and equipment		electronic cruise control system • Diagnostic procedure of the electronic cruise control system • Modern electronic cruise control Circumstantial knowledge Detailed knowledge about: • First aid • Manufacturers service manual • Safety precautions • Waste disposal	• Gloves	
	7.5 Servicing tyre pressure monitoring systems	(a) Diagnosing tyre pressure monitoring systems	Think-ink-pair-share: Guide students through think-ink-pair-share to describe the construction and operation and faults of pressure	The trainee should be able to: • Select tools equipment and safety gear • Interpret electronic tyre pressure monitoring	Diagnosed tyre pressure monitoring system faults conforms to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The trainee should explain how to diagnose tyre pressure monitoring systems Principles: The trainee should explain principles involved in	This element can be achieved at school workshop and the following tools, equipment and safety gears should be available • Vehicle • Service bench	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	Services Assessment	Underpinning Knowledge		
			monitoring system Practical work: Guide the students to identify and locate faulty electronic shift transmissions components Activity: Organize the students in manageable groups to use different tools and equipment to diagnose faults of electronic shift transmissions system	circuit diagrams - Identify and locate components of tyre pressure monitoring system - Check faulty components of tyre pressure monitoring system - Reading fault codes related to tyre pressure monitoring system - Test electronic tyre pressure monitoring system - Observe safety precautions - Clean tools, equipment and work place		- Operation of tyre pressure monitoring system - Diagnosing tyre pressure monitoring systems Theories: The trainee should explain: - Function of tyre pressure monitoring system - Components of the system and their functions - Types of tyre pressure monitoring systems - Faults in tyre pressure monitoring systems Circumstantial knowledge Detailed knowledge about: - First aid - Manufacturers service manual - Safety precautions - Waste disposal	- Spanner kits - Screw driver set - Set of pliers - Test lamp - Hydraulic jack - Digital - Multimeter - 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	Services Assessment	Underpinning Knowledge		
				Store tools and equipment				
		(b) Rectifying tyre pressure monitoring system components	Brainstorm: Guide the students brainstorm on possible causes of tyre pressure monitoring system faults Demonstration: Demonstrate how to use different tools and equipment to rectify tyre pressure monitoring system faults Activity: Organize the students in manageable groups to rectify different tyre pressure monitoring system faults	The trainee should be able to: - Select tools, equipment and safety gear - Identify the faulty diagnosed components of tyre pressure monitoring system - Repair faulty tyre pressure monitoring system components - Replace defective tyre pressure monitoring system components - Test tyre pressure monitoring	Rectified tyre pressure monitoring system functions according to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The trainee should explain how to rectify tyre pressure monitoring systems Principles: The trainee should explain principles involved in rectifying tyre pressure monitoring systems Theories: The trainee should explain: - Function of different tools and equipment to rectify tyre pressure monitoring system - Faults in tyre pressure monitoring systems, causes and remedies - Repair and replace different faults of tyre pressure monitoring system Circumstantial knowledge Detailed knowledge about: - First aid - Manufacturers service manual - Safety precautions	This element can be achieved at school workshop and the following tools, equipment and safety gears should be available - Vehicle - Service bench - Spanner kits - Screw driver set - Set of pliers - Test lamp - Hydraulic jack - Digital - Multimeter - 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	Services Assessment	Underpinning Knowledge		
				system operation - Observe safety precautions - Clean tools, equipment and workplace - Store tools and equipment		Waste disposal		
8.0 Managing workshop activities	8.1 Designing workshop layout	(a) Outlining workshop servicing bay	Group discussion: Organize the students in manageable groups to discuss the concepts related to workshop management and outline different workshop layouts Field visit: Organize field visits to a nearby commercial	The students should be able to: - Plan workshop servicing bay - Locate workshop servicing bay sections - Locate the installation places of different machines at the workshop servicing bay	Outlined workshop servicing bay conforms to environmental and ministry of labour rules and regulations	Knowledge evidence: Detailed knowledge of: Method used: The students should explain how to: Outline workshop servicing bay Principles: The students should explain the principles involved in outlining workshop servicing bay Theories: The students should explain: - Steps to design workshop layout - Components applied in workshop safety and security systems	The following tools, equipment and safety gears are to be available: - Organization structures - Overhead projector - Computer - Flip charts - Workshop with various sections - Different management text books	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	Services Assessment	Underpinning Knowledge		
			workshop and guide students to explore the outlining of workshop servicing bay Activity: Organize the students in manageable groups to outline workshop servicing bay of the school workshop	- Identify and locate convenient places for information resource Centre, stores laundry and latrines, assembly point safety gears equipment - Design security system of tools and equipment - Design and implement safety system to workers - Identify and placemarks and postures - Label safety precautions for workshop materials and goods		Circumstantial knowledge Detailed knowledge about: - Workshop rules and regulations - Safety precautions - Environmental impacts - OSHA requirements and regulations	- Handouts - Stationery - 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	Services Assessment	Underpinning Knowledge		
		(b) Designing layout of light-duty equipment workshop	Targeted questions: Guide students through targeted questions to explore different layout of light-duty equipment workshop Field visit: Organize a field visits to a nearby commercial workshop and guide students to explore the layout of the advanced light-duty equipment workshop Practical work: Organize the students in manageable groups and guide them to identify the necessary section of light duty equipment workshop Activity:	The students should be able to: - Plan workshop layout of light-duty equipment layout - Locate light-duty equipment section - Identify places for safety gears equipment - Identify convenient places for stores - Design and implement safety system to workers - Label safety precautions for workshop materials and goods	Designed layout of light duty equipment workshop conforms to environmental and Ministry of Labor rules and regulations	Knowledge evidence: Detailed knowledge of: Method used: The students should explain how to designing layout of light duty equipment workshop Principles: - The students should explain the principles of designing layout of light duty equipment workshop Theories: The students should explain: - Steps to design light duty equipment section - Components applied in workshop safety and security systems Circumstantial knowledge Detailed knowledge about: - Workshop rules and regulations - Safety precautions - Environmental impacts - OSHA requirements and regulations	The following tools, equipment and safety gears are to be available: - Organization structures - Overhead projector - Computer - Flip charts - Workshop with various sections - Different management text books - Handouts - Stationery - 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	Services Assessment	Underpinning Knowledge		
			Organize the students in manageable groups to design the layout of light duty equipment workshop					
		(c) Designing layout of heavy-duty equipment workshop	Think-ink-pair-share: Guide students through think-ink-pair-share to sketch simple layout of heavy-duty equipment Field visit: Organize a field visits to a nearby commercial workshop and guide students to explore the layout of the advanced heavy-duty equipment workshop Activity: Organize the students in manageable groups to design	The students should be able to: - Plan workshop layout of heavy-duty equipment layout - Locate heavy duty equipment section - Identify places for safety gears equipment - Identify convenient places for stores - Design and implement a safety system for workers	Designed layout of heavy-duty equipment workshop conforms to environmental and Ministry of labor rules and regulations	Knowledge evidence: Detailed knowledge of: Method used: The students should explain how to design layout of heavy-duty equipment workshop Principles: The students should explain the principles involved in Designed layout of the heavy-duty equipment workshop Theories: The students should explain: - Steps to design heavy duty equipment section - Components applied in workshop safety and security systems Circumstantial knowledge Detailed knowledge about: - Workshop rules and regulations - Safety precautions - Environmental impacts	The following tools, equipment and safety gears are to be available: - Organization structures - Overhead projector - Computer - Flip charts - Workshop with various sections - Different management text books - Handouts - Stationery - 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	Services Assessment	Underpinning Knowledge		
			the layout of the heavy-duty equipment workshop	Label safety precautions for workshop materials and goods		OSHA requirements and regulations		
	8.2 Controlling tools and equipment movement	(a) Maintaining tools control system	Group discussion: Organize the students in manageable groups to explain the principles involved in tools control systems Scenario: Provide students in small groups with tool management systems scenarios and let them to suggest the solutions Activity: Organize the students in manageable groups and task them to propose maintaining tools control system which can be	The students should be able to: - Design tools storage system - Identify tools and equipment issued daily from stores - Identify tools and equipment received daily from the user - identify damaged tools and equipment - Identify lost equipment and tools - Discard damaged	Tools and equipment control system maintained as per stores and financial regulations	Knowledge evidence: Detailed knowledge of: Method used: - The students should explain how to maintain tools control system Principles: The students should explain the principles involved in maintaining a tools control system Theories: The students should explain: - Properties of tools and equipment - Effects of weather on different tools - Necessary security in stores/workshops Circumstantial knowledge Detailed knowledge about: - Workshop rules and regulations - Safety precautions - OSHA requirements and regulations	The following tools, equipment and safety gears are to be available: - Skills logbook - Tools and equipment catalogue - Stationeries - Staple machine - Overcoat - Safety boots - Tools list - Walldrobe - Bench with tool crip - Toolboxes - Tools issue voucher - Tools ledger - Equipment ledger	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	Services Assessment	Underpinning Knowledge		
			practiced at the school workshop	tools and equipment				
		(b) Taking inventory of tools and equipment	Targeted questions: Guide students through targeted questions to explore techniques involved in taking inventory of tools and equipment Demonstration: Prepare a set of tools and equipment at the workshop and demonstrate how to record them using a manual inventory sheet and an Excel template. Activity: Organize the students in manageable groups and task them to take inventory of tools and equipment at	The students should be able to: - Record tools and equipment issued daily from stores - Record tools and equipment received daily from user - Record damaged tools and equipment - Record lost equipment and tools	Taking inventory of tools and equipment's per stores and financial regulations	Knowledge evidence: Detailed knowledge of: Method used: The students should explain how to: - Maintain tools ledgers - Conduct - Stock taking - Maintain Tools inventory records Principles: The students should explain the principles involved in taking inventory of tools and equipment in the workshop Theories: The students should explain: - The importances of taking inventory of tools and equipment - Procedures of taking inventory of tools and equipment Circumstantial knowledge Detailed knowledge about: - Workshop rules and regulations - Procurement principles - Safety precautions - OSHA requirements and regulations	The following tools, equipment and safety gears are to be available: - Skills logbook - Tools and equipment catalogue - Stationeries - Scientific calculator - Staple machine - Overcoat - Safety boots - Binding machine - Tools list - Walldrobe - Tools issue voucher - Tools ledger - Equipment ledger - Tools inventory list - Files	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
			the school workshop					
	8.3 Estimating material and labour cost	(a) Keeping records of workshop materials	Think-ink-pair-share: Guide students through think-ink-pair-share to explore techniques for estimating material and labour cost Demonstration: Organize the students in groups and demonstrate how to record different materials at the workshop Activity: Organize the students in manageable groups and task them to keep records of workshop materials	The students should be able to: • Read the inspection report • Identify different workshop materials • Record workshop materials overhead costs • Prepare material requestion equipment and other materials	Records of workshop materials kept as per rules and regulations	Knowledge evidence: Detailed knowledge of: Method used: The students should explain how to record workshop materials Principles: The students should explain the principles of recording workshop materials Theories: The students should explain: • Importance of recording workshop materials • Importance of using genuine materials • Use of parts catalogue Circumstantial knowledge Detailed knowledge about: • Workshop rules and regulations • Procurement documents • OSHA requirements and regulations	The following tools, equipment and safety gears are to be available: • List of spares and material • Prepared materials • Local purchases order (LPO) • Calculator/C computer • Stationeries • Overcoat • Safety boot • Binding machine • Material requisition form (Material requisition voucher form (MVR)) • Job card • Price list	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	Services Assessment	Underpinning Knowledge		
							- Mask - Good receive note (GRN) - Gloves	
		(b) Maintaining man hours/day of workshop staff	Discussion: Guide the students to discuss how to Identify roles of staffs at workshop Identify overtime and holidays Activity: Organize the students in manageable groups and task them to determine hours/day of workshop staff	The students should be able to: - Identify the roles of staff in the workshop - Identify the working hours of the workshop - Identify and record the overtime of staff - Identify holidays	Maintained man hours/day of workshop staff prepared as per task to be performed	Knowledge evidence: Detailed knowledge of: Method used: The students should explain how to maintain man hours/day of workshop staff Principles: The students should explain the principles involved in maintaining man hours/day of workshop staff Theories: The students should explain: - Importance of recording workshop staff hours/day Circumstantial knowledge Detailed knowledge about: - Workshop rules and regulations - Supervision skills - OSHA requirements and regulations	The following tools, equipment and safety gears are to be available: - List of spares and material - Prepared materials - Local purchases order (LPO) - Calculator/Computer - Stationeries - Material requisition form (Material requisition voucher form (MVR) - Job card	
		(c) Performing job cost estimations	Brainstorm: Guide the students to brain	The students should be able to:	Cost estimates of materials and labour	Knowledge evidence: Detailed knowledge of:	The following tools, equipment and 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	Services Assessment	Underpinning Knowledge		
			storm on the job estimation techniques. Scenario: Provide students in small groups with job estimation scenarios and let them to suggest their estimations Activity: Organize the students in manageable groups and task them to determine hours/day of workshop staff	• Read the inspection report • Prepare material cost estimates • Prepare overhead costs • Prepare material request • Prepare quotations and distribute into various shops • Obtain proforma invoices from different shops • Prepare labour costs including other overheads • Clean the tools and equipment	prepared as per the task to be performed	Method used: The students should explain how to perform job cost estimations Principles: The students should explain the principles involved in determining manhour rate to make labour cost estimates Theories: The students should explain: • Importance of estimating materials and labour cost • Importance of using genuine materials • Use of parts catalogue Circumstantial knowledge Detailed knowledge about: • Workshop rules and regulations • Supervision skills • Financial principles • OSHA requirements and regulations	are to be available: • List of spares and material • Calculator/C computer • Stationeries • Binding machine • Material requisition form (Material requisition voucher form (MVR) • Job card • Price list	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
				Store tools, equipment and other materials				
	8.4 Training subordinates	(a) Preparing training needs	Group discussion: Organize the students in manageable groups to discuss the concept related to training subordinates Scenario: Organize the students in manageable groups and provide them scenarios of preparing training needs, let them share their suggestions Activity: Organize the students in manageable groups and task them to prepare training needed	The students should be able to: - Conduct training needs assessment - Identify the training needs of subordinates - Train how to; plan - Prepare training programs for the subordinate - Write reports - Clean work area - Store tools, safety gear, materials and equipment	A training program prepared as per training needs	Knowledge evidence: Detailed knowledge of: Method used: The students should explain how to: - Prepare training program for subordinates Principles: The students should explain the principles involved in preparing training needs Theories: The students should explain: - Importance of manpower survey - Importance of organization structure - Prepare action of curriculum vitae (CV) - Governance methods Circumstantial knowledge Detailed knowledge about: - Supervisory knowledge and skills - OSHA rules and regulations - Safety precautions	The following tools, equipment and safety gears are to be available: - Workshop - Tool kit - Workshop machines ie - Grinding machine - Drilling machine - Valve grinder - Drum and disc service machine - Wheel balancing machine - Wheel alignment	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	Services Assessment	Underpinning Knowledge		
			for workshop subordinates				machine /gauge - Head light aiming machine - Testing benches - Bench vices - Anvil - Hydraulic press • Surface block • First aid kit • Firefighting equipment • Emergency exit • Computer • TV • Organization structure	
		(b) Training of subordinates	Brainstorm: Guide students to brainstorm on different training techniques used to train	The students should be able to: Prepare training programs for	Trained subordinates execute tasks to satisfy the organization's targets	Knowledge evidence: Detailed knowledge of: Method used: The students should explain how to: - Conduct training program to subordinates - Motivate subordinates	The following tools, equipment and safety gears are to be available: - Workshop - 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	Services Assessment	Underpinning Knowledge		
			subordinates in workshops Microteaching: Organize students in small groups and guide them to train each other in a specific topic of their interest. Activity: Organize the students in manageable groups and task them to prepare and implement training for workshop subordinates	the subordinate • Carry out training program • Train how to work assigned • Keep continuous reports • Deliver information to subordinates • Instruct proper use of workshop tools safety gear and equipment • Organize subordinates • Motivate subordinates • Identify potential workers for future vacancies • Clean work area		Principles: The students should explain the principles of supervision Theories: The students should explain: • Importance of manpower survey • Importance of organization structure • Prepare action of curriculum vitae (CV) • Governance methods Circumstantial knowledge Detailed knowledge about: • Supervisory knowledge and skills • OSHA rules and regulations • Safety precautions	• Workshop machines ie - Grinding machine - Drilling machine - Valve grinder - Drum and disc service machine - Wheel balancing machine - Wheel alignment machine /gauge - Head light aiming machine - Testing benches - Bench vices - Anvil	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
				Store tools, safety gears, materials and equipment			- Hydraulic press • Surface block • First aid kit • Firefighting equipment • Emergency exit • Computer • TV • Organization structure	
	8.5 Preparing reports	(a) Collecting information	Think-ink-pair-share: Guide students through think-ink-pair-share to explain the concept related to the collection of information and preparation of reports. Practical work Guide the students to collect the information of used consumables and record them in a hardcopy	The students should be able to: - Collect information for preparing budget reports - Collect information for preparing a budget report - Collect information for preparing action plan - Keep records	The collected information contains the required contents as per management requirements	Knowledge evidence: Detailed knowledge of: The method used: The students should explain how to collect of technical information - Keeping records Principles: The students should explain the principles involved in collecting information Theories: The students should explain: - Importance of collecting information - Contents of technical information Circumstantial knowledge Detailed knowledge about:	The following tools, equipment and safety gears are to be available: - Office/table and chairs - Stationery - Computer - Job card - Subordinates' reports - Binding machine - Photocopy machine - Overcoat - Safety boots	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	Services Assessment	Underpinning Knowledge		
			form and soft copy. Activity: Organize the students in manageable groups and task them to collect different information in the			- Report writing skills - Managerial skills		
		(b) Writing technical reports	Discussion: Organize the students in groups to discuss the contents of the technical report Case study Select any technical report available at the school workshop and guide the students to identify its contents Activity: Guide the students to prepare a template of the technical report that can be used	The trainee should be able to: - Prepare a budget report - Prepare an action plan report - Write technical reports - Keep records	The written reports contain the required contents as per management requirements	Knowledge evidence: Detailed knowledge of: Method used: The trainee should explain: - Preparation of technical reports - Keeping records Principles: The trainee should explain the principles involved in writing technical reports Theories: The trainee should explain: - Importance of reports - Contents of reports - Writing of technical report Circumstantial knowledge Detailed knowledge about: - Report writing skills - Managerial skills	The following tools, equipment and safety gears are to be available: - Office/table and chairs - Stationery - Computer - Job card - 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	Services Assessment	Underpinning Knowledge		
			during the servicing of any auto-electric system of their choice.					
	8.6 Managing workshop business	(a) Performing entrepreneurial tactics	Discussion: Organize the students in groups to elaborate on to apply entrepreneurial tactics at the workshop Demonstration: Use video clips to demonstrate entrepreneurial tactics. Activity: Organize the students in manageable groups to perform entrepreneurial tactics Encourage them to use the internet to explore different related tactics	The trainee 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 the workshop • Purchase basic hand tools and equipment	Performed entrepreneurial tactics conform to stipulated regulations	Knowledge evidence: Detailed knowledge of: Method used: The trainee should explain how to perform entrepreneurial tactics Principles: The trainee should explain principles used involved in performing entrepreneurial tactics Theories: The trainee should explain: • Meaning of “business” • Meaning of workshop • Project write up procedures Circumstantial knowledge Detailed knowledge about: • Entrepreneurial skills • Managerial skills	The following tools, equipment and safety gears are to be available: • Workshop layout chart • Business films/video cassettes • Business magazines • Workshop business regulations • Personal computer	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	Services Assessment	Underpinning Knowledge		
		(b) Conducting manpower planning	Scenario: Organize the students in manageable groups and provide them scenarios of manpower planning and guide them to suggest their planning techniques Activity: Organize the students in manageable groups to conduct manpower planning at the school workshop	The trainee should be able to: - Perform manpower planning - Prepare at least six months' salary for potential workers - Supervise the provision of payment invoices and receipts - Identify labour and overhead costs - Analyze profit and loss	Conducted manpower planning conforms to stipulated regulations	Detailed knowledge of: Method used: The trainee should explain how to conduct manpower planning Principles: The trainee should explain principles involved in conducting manpower planning Theories: The trainee should explain: - Meaning of "business" - Meaning of workshop - Project write up procedures - Good customer care Circumstantial knowledge Detailed knowledge about: - Marketing and use of mass media - Business capital handling	The following tools, equipment and safety gears are to be available: - Workshop layout chart - Business films/video cassettes - Business magazines - Workshop business regulations - Personal computer	
		(c) Supervising junior workers	Brainstorm: Guide the students to brainstorm on supervision skills Activity:	The trainee should be able to: Prepare training needs for junior staff	Supervised junior workers to conforms to stipulated regulations	Knowledge evidence: Detailed knowledge of: Method used: The trainee should explain how to supervise junior workers Principles: The trainee should explain principles involved in supervising junior	The following tools, equipment and safety gears are to be available: Workshop layout chart	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Underpinning Knowledge		
			Organize the students in manageable groups to use the internet and books to explore technics for supervising junior workers	• Supervise the provision of payment invoices and receipts • Identify labour and overhead costs • Identify supervisory technics • Introduce division of labour system • Analyze profit and loss		Theories: The trainee should explain: • Meaning of “supervision” • Motivational technics to junior staffs • Good customer care Circumstantial knowledge Detailed knowledge about: • Marketing and use of mass media • Supervision skills • Business capital handling	• Business films/video cassettes • Business magazines • Workshop business regulations • Personal computer	

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