

# THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY



**AUTO BODY REPAIR SYLLABUS FOR ORDINARY SECONDARY EDUCATION**

**VOCATIONAL STREAM FORM I-IV**

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## **Abbreviations and Acronyms**

AC	Alternating Current
DC	Direct Current
EMA	Environmental Management Authority
MIG	Metal Inert Gas
NEMC	National Environment Management Council
NEST	National e-Procurement System of Tanzania
OHS	Occupational Health and Safety
OSHA	Occupational Safety and Health Authority
PPE	Personal Protective Equipment
PPRA	Public Procurement Regulatory Authority
TIG	Tungsten Inert Gas
TV	Tele Vision
VETA	Vocational Education and Training Authority

### **Definition of Key Terms**

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

**Circumstantial knowledge:** Detailed knowledge, which allows 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 form of evaluative statements.

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

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

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For and on behalf of:

Vocational Education and Training Authority

A handwritten signature in blue ink, appearing to read 'Anthony M. Kasore', with a stylized flourish at the end.

CPA. Anthony M. Kasore

**Director General**

## **1.0 Introduction**

Auto Body Repair is one of the occupations taught in the Ordinary Secondary Education Vocational Stream. Learning Auto Body Repair is essential because Tanzania has a growing demand for motor vehicle services and repairs due to increased transportation needs. These resources can be leveraged to support the country's economy. By teaching Auto Body Repair, students will develop practical skills to repair, restore, and maintain vehicles' bodies and parts, ensuring safety and aesthetic appeal. These skills foster local industries, reduce dependency on imported repair services, and enhance vehicle longevity. In turn, this will foster economic development, create jobs, promote sustainability in vehicle maintenance, and preserve the investment value of vehicles.

Auto Body Repair can describe various types of procedures used to restore damaged vehicles to functional and visually appealing states. These include vehicle checks, electrical system removal and installations, welding, dent repair, sanding, painting, and the replacement of damaged parts, as well as incorporating advanced technology for precision work.

Upon completion of the program, students will possess both theoretical and practical knowledge of Auto Body Repair, from damage assessment to advanced restoration procedures. They will be capable of operating repair tools and machinery, performing vehicle diagnostics, and implementing sustainable practices in the industry, all while adhering to safety regulations. Additionally, students will be equipped with the business skills necessary for managing an Auto Body Repair enterprise, ensuring high standards of quality and innovation in all aspects of the automotive repair industry.

A graduate of this occupation may be employed in both the Government and private sectors, such as ministries/departments, training institutions, research institutions, vehicle manufacturing and repair agencies, self-employment, small, medium, and large automotive industries, and Non-Governmental Organizations (NGOs).

The Auto Body Repair Syllabus is designed to guide the teaching and learning of Auto Body Repair in 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 Body Repair. It contains valuable information that will enable teachers to effectively plan their teaching process and help learners 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 own 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 is to:

- (a) Apply the knowledge, skills and attitudes the student developed in the primary school stage to increase his/her understanding of technical skills;
- (b) Apply technical skills in designing, inventing and making various things to cope with life and solve challenges in society;
- (c) Appreciate citizenship and national virtues;
- (d) Use language skills;
- (e) Demonstrate self-confidence in learning in various fields, including science and technology, technical knowledge and technical skills;
- (f) Apply technical knowledge and skills in designing, discovering and making various things to solve challenges in society, including cross-cutting issues;
- (g) Appreciate procedures and safety rules in using technical tools correctly; and
- (h) Apply the technical knowledge and skills acquired to develop oneself with vocational and technical education and join the workforce.

#### 4.0 General Competences of the Occupation

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

- (a) Demonstrate the principles of workshop management to maintain occupational health, safety rules and regulations;
- (b) Demonstrate basic principles involved in bench work to cut, weld and fabricate various parts of the vehicle body;
- (c) Apply knowledge and technical skills developed to inspect for damages and perform repairs;
- (d) Apply knowledge and technical skills developed to protect, decorate and cleanness/hygiene/ sanitation;

#### 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*

Main competences	Specific competences
1.0 Maintaining safety on the workshop and surrounding	1.1 Maintaining workshop safety
	1.2 Handling accidents and incidents
	1.3 Handling fire accidents
	1.4 Performing first aid
2.0 Performing bench work	2.1 Performing measurements
	2.2 Performing metal cutting
	2.3 Performing metal filing
	2.4 Performing drilling
	2.5 Performing riveting
	2.6 Performing threading
3.0 Performing Sheet Metal Work	2.7 Performing metal forming
	3.1 Performing hand shearing/snipping
4.0 Performing soft soldering and hard soldering on vehicle components and panels	3.2 Performing machine shearing
	4.1. Performing soft soldering
	4.2. Performing metal brazing and bronze welding
5.0 Performing vehicle general check-up	5.1 Carrying out vehicle general check-up
	5.2 Checking electrical wiring system
	5.3 Checking accessories, circuit and components
	5.4 Maintaining batteries
6.0 Performing gas welding on vehicle body panels	6.1 Carrying out gas welding on vehicle body panels
	6.2 Carrying out body panel cutting by flame
7.0 Performing arc welding and cutting on the vehicle frame	7.1 Carrying out mild steel arc welding
	7.2 Carrying out mild steel arc cutting
8.0 Performing straightening of vehicle body panel	8.1 Carrying out straightening of vehicle bent body panel
	8.2 Carrying out spray painting on repaired body panel
9.0 Performing advanced gas welding on vehicle body panel	9.1 Carrying out welding on ferrous metal body panels
	9.2 Carrying out welding on non-ferrous metal body panels
	9.3 Carrying out metal brazing and bronze welding of vehicle body panels
10.0 Performing repair of accident body	10.1 Carrying out dismantling of body parts.

Main competences	Specific competences
panel	10.2 Carrying out straightening by cold and hot shrinking
11.0 Performing resistance welding	11.1 Carrying out resistance welding on sheet metals
	11.2 Carrying out resistance welding on thin metals
12.0 Performing straightening of bent body frame	12.1 Carrying out dismantling of body attachments
	12.2 Carrying out straightening of the bent vehicle frames
13.0 Performing repair of the rusted body part	13.1 Carrying out welding of rusted parts
	13.2 Carrying out mild steel arc cutting
14.0 Performing alignment of vehicle body panels	14.1 Carrying out the alignment of vehicle body panels
	14.2 Carrying out sanding of vehicle body panels
15.0 Performing thick metal cutting by gas flame	15.1 Carrying out gas cutting on thin metal plates
	15.2 Carrying out gas cutting on thick metal plates
16.0 Performing vehicle body plastic filling	16.1 Carrying out plastic filling on rigid body panel
	16.2 Carrying out fibber glass filling
17.0 Performing painting on a vehicle body panel	17.1 Carrying out painting on the exterior body panel
	17.2 Carrying out painting on the interior body panel
18.0 Maintaining emission control system	18.1 Servicing catalytic converter
	18.2 Repairing leakage on exhaust pipe/muffler
19.0 Performing spray painting on vehicle body or panel	19.1 Carrying out spray paint on vehicle body
	19.2 Carrying out metallic spray painting on vehicle body
20.0 Performing arc welding on various vehicle body parts	20.1 Carrying out arc welding on non-ferrous metals
	20.2 Carrying out welding on plates using MIG and TIG welding
21.0 Performing gas welding on vehicle body brackets	21.1 Carrying out gas welding on ferrous and non-ferrous metals
	21.2 Carrying out gas cutting on ferrous metals
22.0 Managing safe work environment	22.1 Managing hazards
	22.2 Carrying out risk assessment
	22.3 Managing environment
23.0 Managing preventive maintenance	23.1 Planning preventive maintenance
	23.2 Supervising preventive maintenance
24.0 Performing fabrication of vehicle body components	24.1 Carrying out fabrication of motor-vehicle body panel
	24.2 Carrying out heavy metal welding
25.0 Performing installation of vehicle body attachment	25.1 Carrying out installation of a windscreen and vent glass
	25.2 Carrying out installation of electrical and body surface fittings
26.0 Managing auto shop	26.1 Establishing tools, equipment and materials profile
	26.2 Estimating material and labour costs
	26.3 Preparing a small-scale tender document
	26.4 Training subordinates on the job
	26.5 Supervising subordinates

## 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 Body Repair.

### The teacher

The teacher is expected to:

- (a) Help the student to learn and develop the intended competences in Auto Body Repair;
- (b) Use teaching and learning approaches that will allow students with different needs and abilities to:
  - (i) Develop the competences needed in the 21<sup>st</sup> Century; and
  - (ii) Actively participate in the teaching and learning process.
- (c) Use student centred instructional strategies that make the student a centre of learning which 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.

### **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.

### **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 behavior;

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

## **8.0 Teaching and Learning Resources**

The process of teaching and learning requires different resources. In that regard, both a teacher and students should work together to collect or improvise alternative resources available in the school and home environment when needed. Teachers and students are expected to constantly seek 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 Body Repair. 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, focuses on determining student's achievement of learning. Teachers are expected to use a variety of summative

assessments including Form Two National Assessment, terminal examination, annual examination, mock examination and project. The scores obtained from these assessments will be used as Continuous Assessment (CA). Therefore, the continuous assessments shall contribute 60% and the National Form IV Examination shall be 40% as indicated in Table 2.

### **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*

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

### **10.0 Number of Periods**

The Auto Body Repair 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 provide sufficient time for hands-on activities.

### **11.0 Teaching and Learning Contents**

The contents of the Syllabus are organised into a matrix with seven (07) columns which are main competences, specific competences, learning activities, suggested teaching and learning methods, assessment criteria 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 on the workshop and surrounding	1.1 Maintaining Workshop Safety	(a) Maintaining Workshop Safety Rules	<p><b>Brainstorming:</b> Facilitate a session where students brainstorm workshop safety rules and discuss their relevance to real-life scenarios.</p> <p><b>Group Discussion:</b> Encourage students to share personal experiences and explore effective safety measures.</p> <p><b>Demonstration:</b> Show examples of improper and proper safety practices in the workshop.</p> <p><b>Hands-on Practical work:</b> Guide students</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Maintain workshop safety rules</li> <li>• Interpret different safety signs in a workshop</li> <li>• Draw safety signs</li> <li>• Store tools, equipment and safety gear</li> <li>• Clean tools, equipment and workplace.</li> </ul>	Workshop safety rules maintained as per OSHA standards and regulations	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Method used:</b> The student should explain how to maintain workshop safety rules and regulations</p> <p><b>Principles:</b> The student should explain principles involved in maintaining workshop safety rules</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Differentiate types of wastes disposal rules</li> <li>• Classify wastes and their hazards</li> <li>• Describe the importance of safety sign</li> <li>• Describe the importance of maintaining workshop</li> </ul>	<p>The following tools, equipment and safety gears are be available:</p> <ul style="list-style-type: none"> <li>• Dust/waste bins</li> <li>• Gloves</li> <li>• Overalls</li> <li>• Cleaning materials</li> <li>• Hoe</li> <li>• Broom</li> <li>• Brush</li> <li>• Gumboots</li> <li>• Dust covers</li> <li>• Safety mask</li> <li>• Printed workshop safety rules and regulations</li> </ul>	56



Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			<p>in groups to inspect the workshop for hazards and identify relevant safety rules.</p> <p><b>Case Study Analysis:</b> Present examples of workshop accidents to discuss causes and preventive measures.</p>	<ul style="list-style-type: none"> <li>Store tools and equipment</li> </ul>		<p>safety rules</p> <p><b>Circumstantial knowledge</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>Workshop rules and regulations</li> <li>NEMC rules and regulation</li> <li>OSHA rules and regulations</li> </ul>		
		(b) Maintaining workshop working environment	<p><b>Brainstorming:</b></p> <p>Guide students to define and explain workshop working environment</p> <p><b>Demonstration</b></p> <p>Show the students how to maintain workshop working environment</p> <p><b>Practical work:</b></p> <p>Organise the students into manageable groups and guide them to maintain working environment around school</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> <li>Maintain workshop working environment</li> <li>Clean tools, equipment and workplace</li> <li>Store tools and</li> </ul>	Workshop working environment maintained as per safety rules and regulations	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Method used:</b> The student should explain how to maintain safety of workshop and its surrounding</p> <p><b>Principles:</b> The student should describe the principles involved in maintaining workshop working environment</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>Outline the key aspects of maintaining</li> </ul>	<p>The following tools, equipment and safety gears are be available:</p> <ul style="list-style-type: none"> <li>Dust/waste bins</li> <li>Gloves</li> <li>Overalls</li> <li>Cleaning materials</li> <li>Hoe</li> <li>Broom</li> <li>Brush</li> <li>Gumboots</li> <li>Dust covers</li> <li>Safety mask</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning 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	equipment		workshop working environment <ul style="list-style-type: none"> <li>Describe the importance of maintaining workshop working environment</li> </ul> <b>Circumstantial knowledge</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>Workshop rules and regulations</li> <li>NEMC rules and regulation</li> <li>OSHA rules and regulations</li> </ul>		
		(c) Maintaining personal safety	<b>Brainstorming:</b> Facilitate discussions to identify personal safety practices.  <b>Demonstration:</b> Show proper use of personal protective equipment (PPE) such as helmets and goggles.	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>Select relevant safety gears</li> <li>Take precautions against health and safety hazards</li> </ul>	Personal safety maintained as per safety rules and regulations	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Method used:</b> The student should explain how to maintain personal safety  <b>Principles:</b> The student should state the principles involved in maintaining personal safety	The following tools, equipment and safety gears are be available: <ul style="list-style-type: none"> <li>Dust bins</li> <li>Gloves</li> <li>Overalls</li> <li>Cleaning materials</li> <li>Hoe</li> <li>Broom</li> <li>Brush</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning 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>Role-Play:</b> Simulate scenarios involving improper personal safety practices and discuss consequences.  <b>Practical Work:</b> Guide students in practicing safe use of PPE and tools.	<ul style="list-style-type: none"> <li>• Use safety gears</li> <li>• Interpret different safety signs in a workshop</li> <li>• Store tools, equipment and safety gear</li> <li>• Dispose different types of wastes as per OHS</li> </ul>		<b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>• Explain possible workshop accidents and their causes</li> <li>• Discuss prevention of workshop accidents</li> <li>• Differentiate types of wastes disposal</li> <li>• Summarize the importance of maintaining personal safety</li> </ul> <b>Circumstantial knowledge</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Workshop rules and regulations</li> <li>• NEMC rules and regulation</li> <li>• OSHA rules and regulations</li> </ul>	<ul style="list-style-type: none"> <li>• Gumboots</li> <li>• Dust covers</li> <li>• safety mask</li> <li>• ICT learning based facilities</li> </ul>	
	1.2 Handling accidents and incidents	(a) Handling mechanical hazards	<b>Brainstorming:</b>  Guide students to define and explain mechanical hazards	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Select relevant safety gears</li> </ul>	Mechanical hazards, accidents and incidents handled as per OSHA rules and	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b> <b>Methods used:</b> The student should elaborate how to:	The following tools, equipment and safety gears are be available:	57

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			<b>Demonstration:</b> Guide students on how to handle mechanical hazards  <b>Practical work:</b> Organise the students into manageable groups and guide them to identify mechanical hazards in school premises	<ul style="list-style-type: none"> <li>• Handle mechanical hazards</li> <li>• Identify causes of health and safety hazards in a workshop and its surroundings</li> <li>• Take precautions against health and safety hazards</li> <li>• Maintain safe working environment</li> <li>• Clean workshop, tools, equipment and workshop surroundings</li> </ul>	regulations	<ul style="list-style-type: none"> <li>• Identify mechanical hazardous materials</li> <li>• Handle mechanical hazardous materials and equipment</li> <li>• Use safety gears</li> <li>• Use colour code and safety signs</li> </ul> <p><b>Principles:</b> The student should state the principles of handling mechanical hazardous materials</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• State the causes of mechanical hazards</li> <li>• Explain the advantages of maintaining mechanical hazards in the workshop</li> </ul> <p><b>Circumstantial knowledge</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• Workshop rules and regulations</li> <li>• NEMC rules and</li> </ul>	<ul style="list-style-type: none"> <li>• Tool kit</li> <li>• mechanical equipment</li> <li>• Air compressor</li> <li>• Fire extinguisher</li> <li>• Power Machines</li> <li>• Overalls</li> <li>• Gloves</li> <li>• Safety boots</li> <li>• Safety clear glasses</li> <li>• First aid kit</li> <li>• First aid poster</li> <li>• Helmet</li> <li>• Safety mask</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
						regulation • OSHA rules and regulations		
		(b) Handling physical hazards	<b>Brainstorming:</b> Guide students to define and explain physical hazards  <b>Demonstration:</b> Guide student and show them how to handle physical hazards  <b>Practical work:</b> Organise the students into manageable groups and guide them to identify physical hazards in school premises	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Select relevant safety gears</li> <li>• Maintain workshop safety</li> <li>• Identify causes of physical hazards in a workshop and its surroundings</li> <li>• Interpret different physical hazards safety signs</li> <li>• Draw physical hazards safety signs</li> <li>• Maintain safe working environment</li> <li>• Clean workshop,</li> </ul>	Physical hazards, accidents and incidents handled as per OSHA rules and regulations	<b>Knowledge evidence:</b>  <b>Detailed knowledge of: Methods used:</b> The student should elaborate how to handle physical hazardous materials and equipment  <b>Principles:</b> The student should describe principles of handling physical hazardous materials  <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>• Discuss the causes of physical hazards</li> <li>• Analyse the advantages of maintaining physical hazards in the workshop</li> </ul> <b>Circumstantial knowledge</b>  <b>Detailed knowledge</b>	The following tools, equipment and safety gears are be available: <ul style="list-style-type: none"> <li>• Tool kit</li> <li>• physical equipment</li> <li>• Air compressor</li> <li>• Fire extinguisher</li> <li>• Power Machines</li> <li>• Overalls</li> <li>• Gloves</li> <li>• Safety boots</li> <li>• Safety clear glasses</li> <li>• First aid kit</li> <li>• First aid poster</li> <li>• Helmet</li> <li>• Safety mask</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
				tools, equipment and workshop surroundings		<b>about:</b> <ul style="list-style-type: none"> <li>• Workshop rules and regulations</li> <li>• NEMC rules and regulation</li> <li>• OSHA rules and regulations</li> </ul>		
		(c) Handling chemical hazards	<b>Brainstorming:</b> Guide students to define and explain chemical hazards  <b>Demonstrations:</b> Guide students and show them how to handle chemical hazards  <b>Practical work:</b> Organise the students in manageable groups and guide them to identify chemical hazards on school premises	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Select relevant safety gears</li> <li>• Maintain workshop safety</li> <li>• Identify causes of health and safety chemical hazards in a workshop and its surroundings</li> <li>• Interpret different chemical hazards safety signs</li> <li>• Draw chemical</li> </ul>	Chemical hazards, accidents and incidents handled as per OSHA rules and regulations	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The student should explain how to handle chemical hazards <b>Principles:</b> The student should present the principles of handling chemical hazardous materials  <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>• Interpret the causes of chemical hazards</li> <li>• Describe the importance of reading manufacturer's instructions before operating machine</li> </ul> <b>Circumstantial knowledge</b> <b>Detailed knowledge</b>	The following tools, equipment and safety gears are be available: <ul style="list-style-type: none"> <li>• Tool kit</li> <li>• mechanical equipment</li> <li>• Air compressor</li> <li>• Fire extinguisher</li> <li>• Power Machines</li> <li>• Overalls</li> <li>• Gloves</li> <li>• Safety boots</li> <li>• Safety clear glasses</li> <li>• First aid kit</li> <li>• First aid poster</li> <li>• Helmet</li> <li>• Safety Mask</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
				hazards safety signs <ul style="list-style-type: none"> <li>• Use safety gears</li> <li>• Maintain personal safety</li> <li>• Dispose different types of chemical wastes as per OHS</li> </ul>		<b>about:</b> <ul style="list-style-type: none"> <li>• Workshop rules and regulations</li> <li>• NEMC rules and regulation</li> <li>• OSHA rules and regulations</li> </ul>		
		(d) Handling electrical hazards	<b>Brainstorming:</b> Guide students to define and explain electrical hazards  <b>Demonstrations:</b> Guide student and show them on how to handle electrical hazards  <b>Practical work:</b> Organise the students in manageable groups and guide them to describe electrical hazards in school premises	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Select relevant safety gears</li> <li>• Maintain workshop safety</li> <li>• Identify causes of health and safety electrical hazards in a workshop and its surroundings</li> <li>• Interpret different</li> </ul>	Electrical hazards, accidents and incidents handled as per OSHA rules and regulations	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The student should elaborate how to handle electrical hazards materials and equipment  <b>Principles:</b> The student should examine the principles of handling electrical hazardous materials <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>• Analyse the causes of electrical hazards</li> <li>• Describe the advantages of maintaining electrical hazards in the</li> </ul>	The following tools, equipment and safety gears are available: <ul style="list-style-type: none"> <li>• Tool kit</li> <li>• mechanical equipment</li> <li>• Air compressor</li> <li>• Fire extinguisher</li> <li>• Power Machines</li> <li>• Overalls</li> <li>• Gloves</li> <li>• Safety boots</li> <li>• Safety clear glasses</li> <li>• First aid kit</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
				electrical hazards safety signs • Draw electrical hazards safety signs • Use safety gears • Maintain personal safety • Dispose different types of electrical wastes		workshop • Explain the importance of reading manufacturer's instructions before operating machine  <b>Circumstantial knowledge</b> <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Workshop rules and regulations</li> <li>• NEMC rules and regulation</li> <li>• OSHA rules and regulations</li> </ul>	<ul style="list-style-type: none"> <li>• First aid poster</li> <li>• Helmet</li> <li>• Safety mask</li> </ul>	
		(e) Maintaining safety gears	<b>Brainstorming:</b> Guide students to define and explain safety gear  <b>Demonstrations:</b> Guide student and show them on how to maintain safety gears  <b>Practical work:</b> Organise the students in manageable groups and guide them to describe different personal safety gears	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Select relevant safety gears</li> <li>• Maintain workshop safety gears</li> <li>• Interpret different safety gear signs</li> <li>• Draw different</li> </ul>	Safety gears are maintained as per workshop rules and regulations	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Method used:</b> The student should explain how to maintain safety gears  <b>Principles:</b> The student should elaborate the principles of maintaining safety gears  <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>• Discuss the types of safety gear</li> </ul>	The following tools, equipment and safety gears are be available: <ul style="list-style-type: none"> <li>• Tool kit</li> <li>• Mechanical equipment</li> <li>• Air compressor</li> <li>• Fire extinguisher</li> <li>• Power Machines</li> <li>• Overalls</li> </ul>	



Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
				safety gear signs • Clean workshop, tools, equipment and workshop surroundings • Store tools, equipment and safety gear • Use safety gears		• Explain advantages of maintaining safety gear • elaborate the importance of maintaining safety gears  <b>Circumstantial knowledge</b> <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Workshop rules and regulations</li> <li>• NEMC rules and regulation</li> <li>• OSHA rules and regulations</li> </ul>	• Gloves • Safety boots • Safety clear glasses • First aid kit • First aid poster • Helmet • Safety mask	
	1.3 Handling fire accidents	(a) Handling firefighting equipment and materials	<b>Brainstorming:</b> Guide students to define and explain firefighting equipment and materials  <b>Simulations:</b> Guide student and simulate on how to handle firefighting equipment and materials	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Apply right class of fire extinguisher</li> <li>• Apply right class of firefighting materials</li> </ul>	Firefighting equipment and materials handled as per rules and regulations	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain how to: <ul style="list-style-type: none"> <li>• Identify different types of fire extinguishers</li> <li>• Apply the right type of fire extinguishers</li> <li>• Apply right type of firefighting materials</li> </ul> <b>Principles:</b> The student	The following tools, equipment and safety gears are be available: <ul style="list-style-type: none"> <li>• Fire extinguishers</li> <li>• Firefighting materials</li> <li>• First aid kit</li> <li>• Gloves</li> <li>• Safety boots</li> <li>• Overall</li> </ul>	56

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			<b>Practical work:</b>  Organise the students into manageable groups and guide them on how to handle different firefighting equipment and materials	<ul style="list-style-type: none"> <li>• Check and test fire extinguishers</li> <li>• Observe safety precautions</li> <li>• Clean up tools, equipment and working place</li> <li>• Store tools, equipment and safety gears</li> </ul>		should elaborate the principles involved in handling firefighting equipment and materials  <b>Theories:</b> The student should:  <ul style="list-style-type: none"> <li>• Describe the types of fire extinguishers</li> <li>• Explain how to handle different types of fire extinguishers</li> <li>• Elaborate the importance of checking and servicing fire extinguishers</li> </ul> <b>Circumstantial knowledge</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Workshop rules and regulations</li> <li>• NEMC rules and regulations</li> <li>• OSHA rules and regulations</li> </ul>	<ul style="list-style-type: none"> <li>• Safety clear glasses</li> <li>• Safety mask</li> <li>• ICT learning based facilities</li> </ul>	
		(b) Handling different types of fire	<b>Brainstorming:</b>  Guide students to explain different	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Select tools,</li> </ul>	Different types of fire handled as per rules and regulations	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The	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	Product/ Services Assessment	Knowledge Assessment		
			<p>types of fire</p> <p><b>simulations:</b></p> <p>Guide student and simulate videos on how to handle different types of fire</p> <p><b>Practical work:</b></p> <p>Organise the students in manageable groups and guide them to identify and handle different types of fire</p>	<p>equipment and safety gears</p> <ul style="list-style-type: none"> <li>Identify common classes of fire</li> <li>React correctly and safely to different types of fire</li> <li>Handle different types of fire</li> <li>Observe safety precautions while dealing with different types of fire</li> <li>Clean up tools, equipment and working place</li> <li>Store tools, equipment and safety gears</li> </ul>		<p>student should:</p> <ul style="list-style-type: none"> <li>Classify fire</li> <li>Identify firefighting equipment and material</li> <li>Explain how to handle different types of fire</li> </ul> <p><b>Principles:</b> The student should explain principles of handling different types of fire</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>Explain the types and common classes of fire</li> <li>Discuss the importance of handling different types of fire</li> <li>Describe fire extinguishers</li> </ul> <p><b>Circumstantial knowledge</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>Workshop rules and</li> </ul>	<p>are be available:</p> <ul style="list-style-type: none"> <li>Fire extinguishers</li> <li>Firefighting materials</li> <li>First aid kit</li> <li>Gloves</li> <li>Safety boots</li> <li>Overall</li> <li>Safety clear glasses</li> <li>Safety mask</li> <li>ICT learning based facilities</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
						regulations <ul style="list-style-type: none"> <li>NEMC rules and regulation</li> <li>OSHA rules and regulations</li> </ul>		
	1.4 Performing first aid	(a) Performing artificial respiration	<p><b>Group discussion:</b> Guide students in manageable groups to discuss and come up with the meaning and procedures of performing artificial respiration</p> <p><b>Interactive simulation:</b> Guide students through interactive simulation and animation to visualize the principles and procedure for performing artificial respiration</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>Select tools and equipment</li> <li>Perform artificial respiration</li> <li>Sterilize first aid tools</li> <li>Observe safety precautions</li> </ul>	Artificial respiration conforms to medical requirements and standards	<p><b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The student should explain how to perform:</p> <ul style="list-style-type: none"> <li>Mouth-to-mouth resuscitation</li> <li>Chest compressions</li> </ul> <p><b>Principles:</b> The student should elaborate the principles involved in performing artificial respiration</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>Differentiate the types of artificial respiration</li> <li>Describe the use of accessories in a first aid kit</li> <li>Explain the importance of performing artificial respiration</li> </ul>	The following tools, equipment and safety gears are be available: <ul style="list-style-type: none"> <li>First aid kit</li> <li>Stretcher</li> <li>Light blanket</li> <li>Sterilizer</li> <li>Towel</li> <li>Overall</li> <li>Medical gloves</li> <li>Safety boots</li> <li>Safety mask</li> <li>ICT based learning facilities</li> </ul>	57

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
						<b>Circumstantial knowledge</b> <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Medical standards</li> <li>• Workshop rules and regulations</li> <li>• OSHA rules and regulations</li> </ul>		
		(b) Performing first aid to minor wound scalpels	<b>Brainstorming:</b> Guide students to define and explain first aid and the procedures to attend minor wound scalpels  <b>Demonstrations:</b> Organise the students into manageable groups and demonstrate how to perform first aid to minor wound scalpels	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Select tools and equipment</li> <li>• Identify types of injuries</li> <li>• Perform artificial respiration</li> <li>• Attend minor wounds</li> <li>• Sterilize first aid tools</li> <li>• Observe safety precautions</li> <li>• Store first aid kit</li> </ul>	First aid offered conforms to medical requirements	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The student should explain how to: <ul style="list-style-type: none"> <li>• Sterilize equipment</li> <li>• Wash the wound</li> <li>• Dress the wound</li> <li>• Perform first aid to minor wound scalpels</li> </ul> <b>Principles:</b> The student should state principles involved in performing first aid to minor wound scalpels  <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>• Differentiate types of wounds</li> </ul>	The following tools, equipment and safety gears are be available: <ul style="list-style-type: none"> <li>• First aid Kit</li> <li>• Stretcher</li> <li>• Light blanket</li> <li>• Sterilizer</li> <li>• Towel</li> <li>• Overall</li> <li>• Medical gloves</li> <li>• Safety boots</li> <li>• Safety mask</li> </ul>	

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				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
						<ul style="list-style-type: none"> <li>Discuss the procedures of attending minor wounds</li> </ul> <p><b>Circumstantial knowledge</b> <b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>Medical standards</li> <li>Workshop rules and regulations</li> <li>OSHA rules and regulations</li> </ul>		
2.0 Performing bench work	2.1 Performing Measurements	(a) Performing Linear Measurement	<p><b>Brainstorming:</b></p> <p>Guide the students to define identify, and explain basic linear measuring tools</p> <p><b>Think-Ink-Pair-Share:</b> Guide students to discuss proper measuring techniques</p> <p><b>Practical work:</b></p> <p>Organise the students into manageable groups and guide them to handle linear measuring tools and perform</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>Select tools and equipment</li> <li>Take measurements and marking</li> <li>Observe safety precautions</li> <li>Clean tools, equipment and work place</li> <li>Store tools, equipment and</li> </ul>	Linear measurement performed accordingly	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should:</p> <ul style="list-style-type: none"> <li>Identify basic linear measuring tools</li> <li>Explain how to calibrate the measuring tools</li> <li>Show how to take measurements</li> </ul> <p><b>Principles:</b> The student should explain the principles of performing linear measurement</p> <p><b>Theories:</b> The student</p>	<p>The following tools, equipment and safety gears are be available:</p> <ul style="list-style-type: none"> <li>Ruler</li> <li>Tape measure</li> <li>Venier calliper</li> <li>Micrometre screw gauge</li> <li>Helmet</li> <li>Apron</li> </ul>	65

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			measurements	workpieces		<p>should:</p> <ul style="list-style-type: none"> <li>• Explain the functions of different types of basic linear measuring tools</li> <li>• Describe the importance of linear measurements</li> <li>• Show errors in linear measurements</li> </ul> <p><b>Circumstantial knowledge</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• Safety precautions while handling basic tools</li> <li>• Safe handling of work tools and equipment</li> </ul>		
		(b) Performing Angular Measurements	<p><b>Demonstration:</b> Show the students how to use angular measuring tools such as protractors and bevels.</p> <p><b>Discussion:</b> Explain the importance of</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>• Perform Angular Measuring</li> <li>• Observe safety</li> </ul>	Angular measurement performed accordingly	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should explain how to:</p> <ul style="list-style-type: none"> <li>• identify basic angular measurement tools</li> </ul>	<p>The following tools, equipment and safety gears are be available:</p> <ul style="list-style-type: none"> <li>• Protractor</li> <li>• Bevel</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			accuracy in angular measurement.  <b>Practical work:</b> Have Students practice measuring angles and marking them accurately.	precautions • Clean tools, equipment and work place • Store tools equipment and workpieces		<ul style="list-style-type: none"> <li>• Perform angular measurements</li> <li>• Store basic tools</li> </ul> <p><b>Principles:</b> The student should state the principles of performing angular measurements</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Explain the functions of different types of basic angular measuring tools</li> <li>• Describe the importance of angular measuring</li> </ul> <p><b>Circumstantial knowledge</b></p> <ul style="list-style-type: none"> <li>• <b>Detailed knowledge about:</b></li> <li>• Safety precautions while handling basic tools</li> <li>• Safe handling of work tools and equipment</li> </ul>	protractor <ul style="list-style-type: none"> <li>• Combination square</li> <li>• Digital angle finder</li> <li>• inclinometer</li> </ul>	
		(c) Using Non-Linear/Non-Angular	<b>Brainstorming:</b> Guide the students to;	<b>The student should be able</b>	Non-linear /non-angular measurement	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>	The following	



Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
		Measurements	<p>define and explain basic non-linear or non-angular measurement tools</p> <p><b>Demonstration:</b> Show students how to use tools such as rope and string in conjunction with metric tools to measure irregular shapes</p> <p><b>Practical work:</b> Organise the students into manageable groups and guide them to perform measurements of a curved line</p>	<p><b>to:</b></p> <ul style="list-style-type: none"> <li>Using Non-Linear/Non-Angular measurement tools</li> <li>Observe safety precautions</li> <li>Clean tools, equipment and work place</li> <li>Store tools equipment and workpieces</li> </ul>	performed accordingly	<p><b>Methods used:</b> The student should explain how to:</p> <ul style="list-style-type: none"> <li>Identify basic non-linear/non-angular measurement tools</li> <li>Perform non-linear/non-angular measurements</li> <li>Transfer empirical reading to metric reading</li> </ul> <p><b>Principles:</b> The student should explain the principles of performing measurement of irregular shapes</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>Present the functions of different types of basic angular measuring tools</li> <li>Describe the importance of non-linear/non-angular measuring tools</li> <li>Explain the types of scales</li> </ul>	<p>tools, equipment and safety gears are be available:</p> <ul style="list-style-type: none"> <li>Rope/cord</li> <li>String</li> <li>Ruller</li> <li>Divider</li> <li>Protractor</li> </ul>	

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				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
						<b>Circumstantial knowledge</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Safety precautions while handling basic tools</li> <li>• Safe handling of work tools and equipment</li> <li>• Waste disposal procedures</li> </ul>		
	2.2 Performing metal cutting	(a) Performing straight cutting	<b>Brainstorming:</b>  Guide the students to; define and explain the concepts of metal cutting process  <b>Demonstration:</b>  Show students on how to identify/select, handle metal straight-cutting tools and equipment, and how to perform straight metal cutting	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Interpret drawings</li> <li>• Select tools and equipment</li> <li>• Observe safety precautions</li> <li>• Clean tools, equipment and work place</li> <li>• Store tools, equipment and</li> </ul>	Straight metal cutting performed accordingly	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain how to: <ul style="list-style-type: none"> <li>• Take measurements</li> <li>• Mark workpieces</li> <li>• Perform straight cutting process</li> </ul> <b>Principles:</b> The student should explain the principles of performing metal straight-cutting  <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>• Differentiate the types</li> </ul>	The following tools, equipment and safety gears are be available: <ul style="list-style-type: none"> <li>• Work bench</li> <li>• Steel rule</li> <li>• Scriber</li> <li>• T-Square</li> <li>• Vernier callipers</li> <li>• Divider</li> <li>• Micrometre</li> <li>• Surface table/plate</li> <li>• Ball pein hammer</li> </ul>	69

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning 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>Practical:</b> Organise the students into manageable groups and guide them to perform straight metal cutting  <b>Think-Ink-Pair-Share:</b> Guide students to discuss challenges and solutions when performing straight cutting	workpieces		of materials and their properties • Describe the application of different cutting tools and equipment • Explain the purpose of each cutting tool <b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b> • Safety precautions while performing cutting process • Safe handling of work tools and equipment • Waste disposal as per OHS	• Anvil • Vernier height gauge • Chisels • File • Hand shear • Power cutting discs • Shearing machine • Centre punch • Hacksaw • Power hacksaw • Safety clear glasses • Gloves • Safety boots • Overall	
		(b) Performing angular cutting	<b>Demonstration:</b> Show the students how to identify angular metal cutting tools and equipment and perform cutting  <b>Practical:</b> Organise the students into manageable groups and guide	<b>The student should be able to:</b> • Select tools and equipment for the task • Take measurements • Cut workpieces	Angular metal cutting performed accordingly	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b> <b>Methods used:</b> The student should explain how to: • Take measurements • Mark workpieces • Perform angular cutting process <b>Principles:</b> The student	The following tools, equipment and safety gears are available:  • Work bench • Steel rule • Scriber • T-Square • Vernier	

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				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			<p>them to perform angular metal cutting</p> <p><b>Think-Ink-Pair-Share:</b> Guide students to discuss challenges and solutions when performing angular cutting</p>	<ul style="list-style-type: none"> <li>• Check for accuracy</li> <li>• Observe safety precautions</li> <li>• Observe safety precautions</li> <li>• Clean tools, equipment and workplace</li> <li>• Store tools, equipment and workpieces</li> </ul>		<p>should state the principles of performing angular cutting</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Differentiate types of materials and their properties</li> <li>• Describe the application of different cutting tools and equipment</li> <li>• Explain the purpose of each cutting tool</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• Safety precautions while performing the cutting process</li> <li>• Safe handling of work tools and equipment</li> <li>• Waste disposal as per OHS</li> </ul>	<p>callipers</p> <ul style="list-style-type: none"> <li>• Divider</li> <li>• Micrometre</li> <li>• Surface table/plate</li> <li>• Ball peen hammer</li> <li>• Anvil</li> <li>• Vernier height gauge</li> <li>• Chisels</li> <li>• File</li> <li>• Hand shear</li> <li>• Power cutting discs</li> <li>• Shearing machine</li> <li>• Centre punch</li> <li>• Hacksaw</li> <li>• Power hacksaw</li> <li>• Safety clear glasses</li> <li>• Gloves</li> <li>• Safety boots</li> <li>• Overall</li> </ul>	
		(c) Performing Chipping/Chiselling	<p><b>Brainstorming:</b></p> <p>Guide the students to define and explain</p>	<b>The student should be able</b>	Chiselling metal cutting performed as per	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The</p>	The following tools, equipment and safety gears	

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				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			<p>chiselling</p> <p><b>Demonstration:</b></p> <p>Show the students how to select and handle tools and equipment for chiselling and perform chiselling operations</p> <p><b>Practical work:</b></p> <p>Organise the students into manageable groups and guide them to perform chiselling for metal cutting</p>	<p><b>to:</b></p> <ul style="list-style-type: none"> <li>• Select tools and equipment</li> <li>• Interpret drawing and measurement</li> <li>• Clean tools, workpieces and workplace</li> <li>• Observe safety precautions</li> <li>• Clean tools, equipment and workplace</li> <li>• Store tools, equipment and workpieces</li> </ul>	specifications	<p>student should explain how to:</p> <ul style="list-style-type: none"> <li>• Take measurements</li> <li>• Mark workpieces</li> <li>• Perform chiselling cutting process</li> </ul> <p><b>Principles:</b> The student should discuss the principles of performing chisel metal cutting</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Differentiate types of metals and their properties</li> <li>• Describe the application of chisel in metal cutting process</li> <li>• Explain purpose of chisel cutting</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• Safety precautions while performing the cutting process</li> <li>• Safe handling of work tools and equipment</li> </ul>	<p>are be available:</p> <ul style="list-style-type: none"> <li>• Work bench</li> <li>• Steel rule</li> <li>• Scriber</li> <li>• T-Square</li> <li>• Vernier callipers</li> <li>• Divider</li> <li>• Micrometre</li> <li>• Surface table/plate</li> <li>• Ball pein hammer</li> <li>• Anvil</li> <li>• Vernier height gauge</li> <li>• Chisels</li> <li>• File</li> <li>• Centre punch</li> <li>• Safety clear glasses</li> <li>• Gloves</li> <li>• Safety boots</li> <li>• Overall</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
						<ul style="list-style-type: none"> <li>Waste disposal as per OHS</li> </ul>		
	2.3 Performing metal filing	(a) Performing flat filing	<p><b>Brainstorming:</b></p> <p>Guide the students to define and explain the concepts of metal filing</p> <p><b>Demonstration:</b></p> <p>Show the students how to select proper tools for metal flat filing and perform the metal flat filing operations</p> <p><b>Practical work:</b></p> <p>Organise the students into manageable groups and guide them to perform metal flat filing operation</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>Interpret drawings</li> <li>Select tools and equipment</li> <li>Take measurements and marking</li> <li>File workpieces</li> <li>Observe safety precautions</li> <li>Clean tools, equipment and work place</li> <li>Store tools, equipment and workpieces</li> </ul>	Metal flat filing performed as per given technical specifications	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The students should explain how to:</p> <ul style="list-style-type: none"> <li>Take measurements</li> <li>Mark workpieces</li> <li>File workpieces</li> </ul> <p><b>Principles:</b> The student should outline the principles of performing metal flat filing</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>Differentiate types of metal flat files and their uses</li> <li>Describe the procedures for cleaning and storage of metal flat files</li> <li>Explain the purpose of each type of file</li> </ul> <p><b>Circumstantial</b></p>	<p>The following tools, equipment and safety gears are available:</p> <ul style="list-style-type: none"> <li>Workbench</li> <li>Clamp/vice clamp</li> <li>Set of flat files</li> <li>File-card</li> <li>Try square</li> <li>Steel rule</li> <li>Centre punch</li> <li>Scriber</li> <li>Divider</li> <li>Overall</li> <li>Gloves</li> <li>Safety clear glasses</li> <li>Safety boots</li> </ul>	70

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning 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>knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Safety precautions about filing</li> <li>• Safe handling of workpieces, tools and equipment</li> <li>• Waste disposal as per OHS</li> </ul>		
		(b) Performing radii filing	<b>Demonstration:</b>  Show the students how to select, handle round filing tools and equipment and properly perform the metal round filing operations  <b>Practical work:</b>  Organise the students into manageable groups and guide them to perform a metal round-filing	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Select tools and equipment for the task</li> <li>• Grind workpieces</li> <li>• Check for accuracy</li> <li>• Observe safety precautions</li> <li>• Clean tools, equipment and workplace</li> </ul>	Metal round filing performed as per given technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain how to: <ul style="list-style-type: none"> <li>• Take measurements</li> <li>• Mark workpieces</li> <li>• File workpiece</li> </ul> <b>Principles:</b> The student should state the principles of performing metal round/radii filing  <b>Theories:</b> The student:	The following tools, equipment and safety gears are be available: <ul style="list-style-type: none"> <li>• Workbench</li> <li>• Clamp/vice clamp</li> <li>• Set of round files</li> <li>• File-card</li> <li>• Try square</li> <li>• Steel rule</li> <li>• Centre punch</li> <li>• Scriber</li> <li>• Divider</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			operation	<ul style="list-style-type: none"> <li>Store tools, equipment and workpieces</li> </ul>		<ul style="list-style-type: none"> <li>Discuss the different types of metal round files and their uses</li> <li>Describe the procedures for cleaning and storage of round files</li> <li>Explain the purpose of round filing</li> </ul> <p><b>Circumstantial knowledge:</b> <b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>Safety precautions about round filling</li> <li>Safe handling of workpieces, tools and equipment</li> <li>Waste disposal as per OHS</li> </ul>	<ul style="list-style-type: none"> <li>Overall</li> <li>Gloves</li> <li>Safety clear glasses</li> <li>Safety boots</li> </ul>	
		(c) Performing angle filing	<p><b>Demonstration:</b></p> <p>Show the students how to select, handle the tools and perform the metal angle filing operations</p> <p><b>Practical work:</b></p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>Select tools and equipment</li> <li>Perform angle filing</li> </ul>	Metal angle filing performed as per given technical specifications	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should explain how to:</p> <ul style="list-style-type: none"> <li>Take measurements</li> <li>Mark workpieces</li> </ul>	<p>The following tools, equipment and safety gears are be available:</p> <ul style="list-style-type: none"> <li>Workbench</li> <li>Clamp/vice</li> </ul>	



Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			Organise the students into manageable groups and guide them to perform a metal angle-filing operation	<ul style="list-style-type: none"> <li>• Observe safety precautions</li> <li>• Clean tools, workpieces and workplace</li> <li>• Store tools, equipment and workpieces</li> </ul>		<ul style="list-style-type: none"> <li>• File workpieces</li> </ul> <p><b>Principles:</b> The student should state the principles of performing metal angle filing</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Differentiate types of metal angle files and their uses</li> <li>• Show the procedures for cleaning and storage of metal angle files</li> <li>• Explain the purpose of angle filing</li> </ul> <p><b>Circumstantial knowledge: Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• Safety precautions about metal round filing</li> <li>• Safe handling of workpieces, tools and equipment</li> <li>• Waste disposal as per OHS</li> </ul>	clamp <ul style="list-style-type: none"> <li>• Set of angle files</li> <li>• File-card</li> <li>• Three angle/ triangle</li> <li>• Try square</li> <li>• Steel rule</li> <li>• Centre punch</li> <li>• Scriber</li> <li>• Divider</li> <li>• Overall</li> <li>• Gloves</li> <li>• Safety clear glasses</li> <li>• Safety boots</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
	2.4 Performing drilling	(a) Performing hand drilling on plate	<p><b>Brainstorming:</b></p> <p>Guide the students to define and explain the concept of drilling</p> <p><b>Demonstration:</b></p> <p>Show the students how to select, properly handle tools and equipment and perform hand drilling on metal plate</p> <p><b>Practical work:</b></p> <p>Organise the students into manageable groups and guide them to perform hand drilling operations on a given metal workpiece</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>• Interpret drawings</li> <li>• Select tools, equipment and materials</li> <li>• Mark workpieces</li> <li>• Observe safety precautions</li> <li>• Clean tools, equipment and work place</li> <li>• Store tools, equipment and workpiece</li> </ul>	Hand drilled hole conforms to technical specifications	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should elaborate how to:</p> <ul style="list-style-type: none"> <li>• Perform drilling using hand machine</li> <li>• Perform reaming</li> <li>• Calculate drill size</li> <li>• Select drill bit type and size</li> </ul> <p><b>Principles:</b> The student should state the principles of performing hand drilling</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Describe drilling procedures</li> <li>• Explain types of drilling machines</li> <li>• Describe tools and equipment used in hand drilling</li> <li>• Discuss the importance</li> </ul>	<p>The following tools, equipment and safety gears are be available:</p> <ul style="list-style-type: none"> <li>• Work bench</li> <li>• Hand drilling machine</li> <li>• Centre punch</li> <li>• Hammer (Ball pein hammer)</li> <li>• Scriber</li> <li>• Steel rule</li> <li>• Try square</li> <li>• Set of drill bits</li> <li>• Oil can</li> <li>• Wire brush</li> <li>• Vernier calliper</li> <li>• Calculator</li> <li>• Reamers</li> <li>• Safety clear glasses</li> <li>• Gloves</li> <li>• Goggles</li> <li>• Safety boots</li> <li>• Overalls</li> </ul>	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	Product/ Services Assessment	Knowledge Assessment		
						of coolant in drilling process <ul style="list-style-type: none"> <li>Identify the materials used to manufacture drill bits</li> <li>Show how to drill bit cutting angles</li> </ul> <b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>Safety precautions while performing the task</li> <li>Safe handling of tools and equipment</li> <li>Waste disposal</li> </ul>		
		(b) Performing drilling on bench drilling machine	<b>Demonstration:</b>  Show the students how to select and properly handle tools, equipment and machines, and perform bench drilling on a metal	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>Select tools and equipment</li> <li>Interpret drawings and measurements given</li> </ul>	Machine drilled hole conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should describe how to: <ul style="list-style-type: none"> <li>Perform drilling on bench drill machine</li> <li>Perform reaming</li> <li>Calculate drill size</li> </ul>	The following tools, equipment and safety gears are be available: <ul style="list-style-type: none"> <li>Workbench</li> <li>Bench drilling machine and accessories</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			<p>plate</p> <p><b>Practical work:</b></p> <p>Organise the students into manageable groups and guide them to perform bench drilling operations on given metal workpieces</p>	<ul style="list-style-type: none"> <li>• Cut a workpiece into recommended size</li> <li>• Perform drilling</li> <li>• Observe safety precautions</li> <li>• Clean tools, equipment and work place</li> <li>• Store tools, equipment and workpieces</li> </ul>		<ul style="list-style-type: none"> <li>• Select drill bit type, size and drilling speed</li> </ul> <p><b>Principles:</b> The student should elaborate the principles of performing powered machine bench drilling</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Explain drilling procedures</li> <li>• Describe the types of drilling machines</li> <li>• Describe tools and equipment used in hand drilling</li> <li>• Discuss the importance of coolant in drilling process</li> <li>• Explain materials used to manufacture drill bits</li> <li>• Drill bit cutting angles</li> <li>• Explain drilling speed</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge</b></p>	<ul style="list-style-type: none"> <li>• Centre punch</li> <li>• Hammer (Ball pein hammer)</li> <li>• Scriber</li> <li>• Steel rule</li> <li>• Try square</li> <li>• Set of drill bits</li> <li>• Oil can</li> <li>• Wire brush</li> <li>• Vernier callipers</li> <li>• Calculator</li> <li>• Reamers</li> <li>• Safety clear glasses</li> <li>• Gloves</li> <li>• Goggles</li> <li>• Safety boots</li> <li>• Overalls</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning 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>about:</b> <ul style="list-style-type: none"> <li>• Safety precautions while performing the task</li> <li>• Safe handling of tools and equipment</li> <li>• Waste disposal</li> </ul>		
		(c) Performing counter-boring drilled holes	<b>Brainstorming:</b> Guide the students to define and describe counter bore drilling  <b>Group discussion:</b> Organise students into small groups to describe relationships between bore hole and counter bore hole  <b>Practical work:</b> Organise the students into manageable groups and guide them to perform counter bore drilling on given metal workpieces	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Select tools and equipment</li> <li>• Interpret drawings and measurement</li> <li>• Clamp the workpiece to the Bench vice</li> <li>• Perform reaming</li> <li>• Observe safety precautions</li> <li>• Clean tools, equipment and work place</li> <li>• Store tools,</li> </ul>	Counter bored drilled hole conforms to technical specifications	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The student should explain how to: <ul style="list-style-type: none"> <li>• Perform counter boring drilled hole</li> <li>• Perform reaming</li> <li>• Calculate drill size</li> <li>• Select drill bit type, size and drilling speed</li> </ul> <b>Principles:</b> The student should explain the principles of performing counter boring hole drilling  <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>• Present counter boring hole drilling</li> </ul>	The following tools, equipment and safety gears are be available: <ul style="list-style-type: none"> <li>• Work bench</li> <li>• Hand drill/Bench drilling machine and accessories</li> <li>• Centre punch</li> <li>• Hammer (Ball pein hammer)</li> <li>• Scriber</li> <li>• Steel rule</li> <li>• Try square</li> <li>• Set of drill bits</li> <li>• Oil can</li> <li>• Wire brush</li> <li>• Vernier</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning 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 workpieces		<p>procedures</p> <ul style="list-style-type: none"> <li>• Describe the types of tools, equipment and machines used for counter bored hole drilling</li> <li>• Show the importance of coolant in drilling process</li> <li>• Identify the materials used to manufacture drill bits</li> <li>• Describe drill bit cutting angles</li> <li>• Highlight drilling speed</li> </ul> <p><b>Circumstantial knowledge:</b> <b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• Safety precautions while performing the task</li> <li>• Safe handling of tools and equipment</li> <li>• Waste disposal</li> </ul>	<p>callipers</p> <ul style="list-style-type: none"> <li>• Calculator</li> <li>• Reamers</li> <li>• Safety clear glasses</li> <li>• Gloves</li> <li>• Goggles</li> <li>• Safety boots</li> <li>• Overalls</li> </ul>	
	2.5 Performing riveting	(a) Joining sheet metal by manual/ sold/ cold riveting	<b>Brainstorming:</b>  Guide the students to define and explain the concept of	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Interpret drawings</li> </ul>	Cold riveted workpieces conform to technical specifications	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The student should explain how to:	The following tools, equipment and safety gears	58

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			reverting  <b>Demonstration:</b>  Show the students how to select proper tools, equipment and machines and perform cold reverting  <b>Practical work:</b>  Organise the students into manageable groups and guide them to perform cold rivet metal workpieces	<ul style="list-style-type: none"> <li>• Select tools, equipment and materials</li> <li>• Mark workpieces</li> <li>• Cut workpieces</li> <li>• Drill holes</li> <li>• Observe safety precautions</li> <li>• Clean tools, equipment, workpieces and work place</li> <li>• Store tools, and equipment</li> </ul>		<ul style="list-style-type: none"> <li>• Perform measurements</li> <li>• Mark workpieces</li> <li>• Rivet pieces in different sizes</li> </ul> <b>Principles:</b> The student should state the principles of performing manual riveting  <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>• Describe the types of joints</li> <li>• Identify types of rivets</li> <li>• Present the application of different materials in riveting</li> <li>• Discuss the purpose of riveting</li> <li>• Show the use of tools, equipment and machines</li> </ul> <b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Safety precautions while performing the task</li> </ul>	are be available: <ul style="list-style-type: none"> <li>• Rivet sets</li> <li>• Steel rule</li> <li>• Wire brush</li> <li>• T-Square</li> <li>• Centre punch</li> <li>• Drilling machine</li> <li>• Set of drill bits</li> <li>• Chisel</li> <li>• Divider</li> <li>• Shearing machine</li> <li>• Ball pein hammer</li> <li>• Rivet head forming tools</li> <li>• Data book</li> <li>• Anvil</li> <li>• Workbench</li> <li>• Pliers</li> <li>• Vice grip</li> <li>• Hacksaw</li> <li>• Helmet</li> <li>• Goggles</li> <li>• Gloves</li> <li>• Safety boot</li> <li>• Overall</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
						<ul style="list-style-type: none"> <li>• Safe handling of work tools, equipment and workpieces</li> <li>• Waste disposal</li> </ul>		
		(b) Performing Pop Riveting	<p><b>Demonstration:</b> Show the students how to select proper tools, equipment and machines and perform pop reverting</p> <p><b>Practical work:</b>  Organise the students into manageable groups and guide them to perform pop rivet of metal workpieces</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>• Select tools and equipment</li> <li>• Perform riveting</li> <li>• Observe safety precautions</li> <li>• Clean tools, equipment, and work place</li> <li>• Store tools, and equipment</li> </ul>	Pop riveted workpieces conform to technical specifications	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should explain how to:</p> <ul style="list-style-type: none"> <li>• Perform measurement</li> <li>• Mark workpieces</li> <li>• Rivet metal workpieces of different thickness</li> </ul> <p><b>Principles:</b> The student should explain the principles of pop riveting to join metals</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Describe the types of joints</li> <li>• Distinguish types of rivets</li> <li>• Explain the application of different materials in riveting</li> </ul>	<p>The following tools, equipment and safety gears are be available:</p> <ul style="list-style-type: none"> <li>• Rivet sets</li> <li>• Riveting plier</li> <li>• Steel rule</li> <li>• Wire brush</li> <li>• T-Square</li> <li>• Centre punch</li> <li>• Drilling machine</li> <li>• Set of drill bits</li> <li>• Rivet gun</li> <li>• Piece of wood</li> <li>• Chisel</li> <li>• Divider</li> <li>• Shearing machine</li> <li>• Soft hammer</li> <li>• Ball pein hammer</li> </ul>	



Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
						<ul style="list-style-type: none"> <li>• Explain the purposes of riveting</li> <li>• Differentiate between manual and pop rivet</li> <li>• Elaborate the use of tools, equipment and machines</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• Safety precautions while performing the task</li> <li>• Safe handling of work tools, equipment and workpieces</li> <li>• Waste disposal</li> </ul>	<ul style="list-style-type: none"> <li>• Data book</li> <li>• Anvil</li> <li>• Work bench</li> <li>• Pliers</li> <li>• Vice grip</li> <li>• Hacksaw</li> <li>• Helmet</li> <li>• Goggles</li> <li>• Gloves</li> <li>• Safety boot</li> <li>• Overall</li> </ul>	
	2.6 Performing threading	(a) Cutting thread die	<p><b>Brainstorming:</b></p> <p>Guide the students to define and explain the external thread (die)</p> <p><b>Demonstration:</b></p> <p>Show the students how to identify, select, handle tools,</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>• Interpret drawings</li> <li>• Select tools, equipment and materials</li> <li>• Mark workpieces</li> </ul>	Threaded die cut conform to technical specifications	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should explain how to:</p> <ul style="list-style-type: none"> <li>• Select materials</li> <li>• Mark workpieces</li> <li>• Select thread pitch</li> <li>• Cut external threads</li> </ul>	<p>The following tools, equipment and safety gears are be available:</p> <ul style="list-style-type: none"> <li>• Set of taps and stock wrenches</li> <li>• Set of dies and stock</li> </ul>	58

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning 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, machines and materials, and perform cutting of external thread  <b>Practical work:</b> Organise the students into manageable groups and guide them to perform external thread cutting on metal workpieces	<ul style="list-style-type: none"> <li>• Observe safety precautions</li> <li>• Clean tools, equipment, and workplace</li> <li>• Store tools, and equipment</li> </ul>		<p><b>Principles:</b> The student should explain the principles of cutting external thread (die)</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Explain the function of dies</li> <li>• Identify the types of dies</li> <li>• Classify threads</li> <li>• Highlight the purpose of die</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• Safety precautions while cutting threads</li> <li>• Safe handling of tools, equipment and materials</li> <li>• Waste disposal</li> </ul>	wrenches <ul style="list-style-type: none"> <li>• Work bench</li> <li>• Bench vice</li> <li>• Wire brush</li> <li>• Oil can</li> <li>• Scriber</li> <li>• Steel rule</li> <li>• Micrometres</li> <li>• Hacksaw</li> <li>• Thread gauges</li> <li>• Vernier callipers</li> <li>• File</li> <li>• Thread data manual</li> <li>• Gloves</li> <li>• Goggles</li> <li>• Safety boots</li> <li>• Overalls</li> </ul>	
		(b) Performing tapping	<b>Brainstorming:</b> Guide the students to define and explain	<b>The student should be able to:</b>	Internal thread (tap) cut	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>	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	Product/ Services Assessment	Knowledge Assessment		
			<p>the concept of making internal thread (Tap)</p> <p><b>Demonstration:</b></p> <p>Show the students how to identify, select, handle tools, equipment, machines and materials, and perform cutting of internal thread</p> <p><b>Practical work:</b></p> <p>Organise the students into manageable groups and guide them to perform internal thread cutting on metal workpieces</p>	<ul style="list-style-type: none"> <li>• Cut internal threads</li> <li>• Observe safety precautions</li> <li>• Clean tools, equipment, workpieces and work place</li> <li>• Store tools, equipment and workpieces</li> </ul>	conform to technical specifications	<p><b>Methods used:</b> The student should explain how to:</p> <ul style="list-style-type: none"> <li>• Select materials</li> <li>• Mark workpieces</li> <li>• Select thread pitch</li> <li>• Cut external threads</li> </ul> <p><b>Principles:</b> The student should state the principles of cutting internal thread (Tap)</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Elaborate the functions of taps</li> <li>• Distinguish types of taps</li> <li>• Classify threads</li> <li>• Explain purpose of tapping</li> <li>• Differentiate between tap and die</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p>	<p>and safety gears are be available:</p> <ul style="list-style-type: none"> <li>• Set of taps and stock wrenches</li> <li>• Work bench</li> <li>• Bench vice</li> <li>• Wire brush</li> <li>• Set of drill bits</li> <li>• Oil can</li> <li>• Scriber</li> <li>• Steel rule</li> <li>• Micrometres</li> <li>• Drilling machine</li> <li>• Hacksaw</li> <li>• Thread gauges</li> <li>• Vernier callipers</li> <li>• File</li> <li>• Centre drill</li> <li>• Centre punch</li> <li>• Thread data manual</li> <li>• Gloves</li> <li>• Goggles</li> <li>• Safety boots</li> <li>• Overalls</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
						<ul style="list-style-type: none"> <li>• Safety precautions while cutting threads</li> <li>• Safe handling of tools, equipment and materials</li> <li>• Waste disposal</li> </ul>		
	2.7 Performing metal forming	(a) Bending flat material	<p><b>Brainstorming:</b></p> <p>Guide the students to define and concept of metal bending</p> <p><b>Discussion:</b></p> <p>Organise the students into manageable groups and guide them to interpret drawing, scale reading and transformation</p> <p><b>Demonstration:</b></p> <p>Show the students how to identify, select, handle tools, equipment, machines and material, and perform flat metal bending</p> <p><b>Practical work:</b></p> <p>Organise the students</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>• Interpret drawing</li> <li>• Select tools, equipment and workpieces</li> <li>• Mark workpieces</li> <li>• Clamp workpieces on bench vice</li> <li>• Bend workpieces</li> <li>• Observe safety precautions</li> <li>• Clean tools, equipment, workpieces and work place</li> <li>• Store tools,</li> </ul>	The workpiece formed conforms to technical specifications	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should elaborate how to:</p> <ul style="list-style-type: none"> <li>• Interpret drawing</li> <li>• Take measurements</li> <li>• Mark the dimension</li> <li>• Select material</li> <li>• Form workpieces in different shapes</li> </ul> <p><b>Principles:</b> The student should state the principles of:</p> <ul style="list-style-type: none"> <li>• Rolling</li> <li>• Holding and aligning workpieces</li> <li>• Forming process</li> <li>• Making allowances for joints</li> </ul>	<p>The following tools, equipment and safety gears are be available:</p> <ul style="list-style-type: none"> <li>• Work bench</li> <li>• Bench vice</li> <li>• Try square</li> <li>• Vernier callipers</li> <li>• Steel rule</li> <li>• Level protractor</li> <li>• Spring divider</li> <li>• Scriber</li> <li>• Anvil</li> <li>• Chisel</li> <li>• Hacksaw</li> <li>• Hammer</li> <li>• Bending machine</li> <li>• Leather gloves</li> <li>• Overall</li> </ul>	70

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			into manageable groups and guide them to perform flat metal bending as per specifications	equipment and remained material		<p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Identify the types of tools, equipment and machines used for metal forming</li> <li>• Show how to calculations required</li> <li>• Determine scales reading and perform conversions</li> <li>• Explain the purpose of metal forming</li> </ul> <p><b>Circumstantial knowledge: Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• Safety precautions while forming metal</li> <li>• Safe handling of tools and equipment</li> <li>• Waste disposal</li> </ul>	<ul style="list-style-type: none"> <li>• Safety boots</li> <li>• Safety glasses</li> </ul>	
		(b) Rolling round material	<p><b>Brainstorming:</b></p> <p>Guide the students to define the concept of metal rolling</p> <p><b>Discussion:</b></p> <p>Organise students</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>• Interpret drawing</li> <li>• Select tools, equipment</li> </ul>	The workpiece formed conforms to technical specifications	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should explain how to:</p> <ul style="list-style-type: none"> <li>• Take measurements</li> </ul>	<p>The following tools, equipment and safety gears are be available:</p> <ul style="list-style-type: none"> <li>• Workbench</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			<p>into manageable groups and guide them to interpret drawing, scale reading and transformation</p> <p><b>Demonstration:</b></p> <p>Show the students how to identify, select, handle tools, equipment, machines and materials, and perform round metal rolling</p> <p><b>Practical work:</b></p> <p>Organise the students into manageable groups and guide them to perform round metal rolling as per specifications</p>	<p>and workpieces</p> <ul style="list-style-type: none"> <li>• Mark workpieces</li> <li>• Clamp workpieces on bench vice</li> <li>• Bend workpieces</li> <li>• Observe safety precautions</li> <li>• Clean tools, equipment, workpieces and work place</li> <li>• Store tools, equipment and remained material</li> </ul>		<ul style="list-style-type: none"> <li>• Form workpieces in different shapes</li> </ul> <p><b>Principles:</b> The student should state the principles of:</p> <ul style="list-style-type: none"> <li>• Rolling</li> <li>• Using tools, equipment and machines</li> <li>• Holding and aligning workpieces</li> <li>• Forming process</li> <li>• Making allowances for joints</li> </ul> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Highlight the types of tools, equipment and machines used for metal forming</li> <li>• Show how to perform Calculations as required</li> <li>• Determine scales reading and perform conversions</li> </ul> <p><b>Circumstantial</b></p>	<ul style="list-style-type: none"> <li>• Bench vice</li> <li>• Try square</li> <li>• Vernier callipers</li> <li>• Steel rule</li> <li>• Hacksaw</li> <li>• Level protractor</li> <li>• Spring divider</li> <li>• Scriber</li> <li>• Anvil</li> <li>• Chisel</li> <li>• Hammer</li> <li>• Radius gauges</li> <li>• Rolling machine</li> <li>• Leather gloves</li> <li>• Overall</li> <li>• Safety boots</li> <li>• Safety glasses</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning 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>knowledge:</b> <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Safety precautions while forming metal</li> <li>• Safe handling of tools and equipment</li> <li>• Waste disposal</li> </ul>		
3.0 Performing Sheet Metal Work	3.1 Performing hand Shearing/snipping	(a) Performing straight shearing	<b>Brainstorming:</b> Guide the students to define and explain the concept of shearing  <b>Demonstration:</b> Show the students how to identify, select and handle tools, equipment and materials to perform metal straight shearing  <b>Practical work:</b> Organise the students into manageable groups and guide them to perform	<ul style="list-style-type: none"> <li>• The student should be able to:</li> <li>• Interpret working drawing</li> <li>• Perform calculations</li> <li>• Select materials</li> <li>• Select snip for the job</li> <li>• Take correct measures</li> <li>• Observe safety precautions</li> <li>• Clean tools, equipment, workpieces and work place</li> <li>• Store tools, equipment</li> </ul>	A straight sheared workpiece conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should clarify how to: <ul style="list-style-type: none"> <li>• Take measurements</li> <li>• Hold and align workpieces</li> <li>• Perform straight hand snip cutting</li> </ul> <b>Principles:</b> The student should explain the principles involved in performing straight-hand metal shearing  <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>• Distinguish the types</li> </ul>	The following tools, equipment and safety gears are available: <ul style="list-style-type: none"> <li>• Working drawing table</li> <li>• Metal sheets</li> <li>• Straight tin snips</li> <li>• Work bench</li> <li>• Bench vice</li> <li>• Try square</li> <li>• Ruler</li> <li>• Centre punch</li> <li>• Hand gloves</li> <li>• Knier callipers</li> <li>• Overall</li> <li>• Safety glass</li> <li>• Files</li> <li>• Soft hammer</li> </ul>	129

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			straight hand metal shearing as per specifications	and remained materials		of shearing machines <ul style="list-style-type: none"> <li>Describe the properties of materials</li> <li>Differentiate types of snipers and their applications</li> <li>Elaborate the purpose of metal shearing</li> </ul> <b>Circumstantial knowledge</b> <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>Safety precautions when threading</li> <li>Environmental issues</li> </ul>	<ul style="list-style-type: none"> <li>Scribers</li> <li>Wire brush</li> </ul>	
		(b) Performing combination hand shearing/snipping	<b>Discussion:</b> Organise students into manageable groups and ask them to differentiate between straight and combination hand metal shearing  <b>Practical work:</b> Organise the students into manageable groups, and guide them to select proper tools, equipment and	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>Interpret drawing</li> <li>Select tools, equipment and workpieces</li> <li>Mark workpieces</li> <li>Hold workpieces</li> <li>Perform combination</li> </ul>	A combination sheared workpiece conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should describe how to: <ul style="list-style-type: none"> <li>Perform measurements</li> <li>Use combination hand snip shearing</li> <li>Hold and align workpieces</li> <li>Perform combination hand metal shearing</li> </ul>	The following tools, equipment and safety gears are be available: <ul style="list-style-type: none"> <li>Working drawing table</li> <li>Metal sheets</li> <li>Combination tin snips</li> <li>Workbench</li> <li>Bench vice</li> <li>Try square</li> <li>Ruler</li> </ul>	



Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			material and perform hand combination metal shearing	sheet metal shearing <ul style="list-style-type: none"> <li>• Observe safety precautions</li> <li>• Clean tools, equipment, workpieces and work place</li> <li>• Store tools, equipment and remained materials</li> </ul>		<b>Principles:</b> The student should explain the principles of performing combination hand shearing  <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>• Distinguish the types of shearing tools, equipment and machines</li> <li>• Describe the properties of materials</li> <li>• Differentiate types of snipers and their applications</li> <li>• Differentiate between hand shearing and combination hand shearing</li> </ul> <b>Circumstantial knowledge</b> <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Safety precautions when threading</li> <li>• Environmental issues</li> </ul>	<ul style="list-style-type: none"> <li>• Centre punch</li> <li>• Hand gloves</li> <li>• Knier callipers</li> <li>• Overall</li> <li>• Safety glass</li> <li>• Files</li> <li>• Soft hammer</li> <li>• Scribers</li> <li>• Wire brush</li> </ul>	
		(c) Performing circular	<b>Brainstorming:</b> Guide the students to define and explain	<b>The student should be able</b>	A circular sheared workpiece	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The	The following	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
		shearing	<p>the concept of circular (curve) metal shearing</p> <p><b>Demonstration:</b> Show the students how to identify, select and handle tools, equipment and materials to perform hand circular metal shearing</p> <p><b>Practical work:</b> Guide the students in manageable groups and ask them to select proper tools, equipment, machines, materials and perform circular hand metal shearing</p>	<p><b>to:</b></p> <ul style="list-style-type: none"> <li>• Interpret drawing</li> <li>• Select tools, equipment and workpieces</li> <li>• Mark workpieces</li> <li>• Hold workpieces</li> <li>• Perform combination sheet metal shearing</li> <li>• Observe safety precautions</li> <li>• Clean tools, equipment, workpieces and work place</li> <li>• Store tools, equipment and remained materials</li> </ul>	conforms to technical specifications	<p>student should explain how to:</p> <ul style="list-style-type: none"> <li>• Take measurement</li> <li>• Hold and align workpieces</li> <li>• Handle shearing machine</li> <li>• Perform circular hand shearing</li> </ul> <p><b>Principles:</b> The student should state the principles of performing circular hand metal shearing</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Explain the types of shearing machines</li> <li>• Describe the properties of materials</li> <li>• Differentiate types of snipers and their applications</li> <li>• Clarify the purpose of circular shearing</li> </ul> <p><b>Circumstantial knowledge</b></p> <p><b>Detailed knowledge</b></p>	<p>tools, equipment and safety gears are be available:</p> <ul style="list-style-type: none"> <li>• Working drawing</li> <li>• Metal sheets</li> <li>• Circular tin snips</li> <li>• Curve tin snip</li> <li>• Work bench</li> <li>• Bench vice</li> <li>• Try square</li> <li>• Ruler</li> <li>• Centre punch</li> <li>• Hack saw and blades</li> <li>• Hand gloves</li> <li>• Knier callipers</li> <li>• Overall</li> <li>• Safety glass</li> <li>• Files</li> <li>• Soft hammer</li> <li>• Scribes</li> <li>• Wire brush</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning 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>about:</b> <ul style="list-style-type: none"> <li>• Safety precautions when performing circular hand metal shearing</li> </ul>		
	3..2 Performin g machine shearing	(a) Performing straight shearing	<b>Brainstorming:</b> Guide the students to define and explain the concept of machine metal shearing  <b>Demonstration:</b> Show the students how to identify, select and handle tools, equipment and materials and then perform machine straight metal shearing  <b>Practical work:</b> Organise the students into manageable groups and guide them to perform	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Interpret working drawings</li> <li>• Select suitable materials and sizes</li> <li>• Identify shearing machine size</li> <li>• Take measurements</li> <li>• Mark out</li> <li>• Check sharpness and tightness of blade</li> <li>• Perform straight machine metal shearing</li> <li>• Observe safety</li> </ul>	A machine straight sheared metal conforms to technical specifications	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The student should: <ul style="list-style-type: none"> <li>• Differentiate ways of performing straight machine shearing</li> <li>• Describe machine shearing process</li> <li>• Explain the Procedure of performing straight machine shearing</li> </ul> <b>Principles:</b> The student should discuss the principles of performing straight machine shearing  <b>Theories:</b> The student should:	The following tools, equipment and safety gears are be available: <ul style="list-style-type: none"> <li>• Working drawing table</li> <li>• Shearing machine</li> <li>• Metal sheet</li> <li>• Scriber</li> <li>• Straight edge</li> <li>• Measuring tape</li> <li>• Try square</li> <li>• Workbench</li> <li>• Ball pein hammer</li> <li>• Leather gloves</li> <li>• Leather apron</li> <li>• Safety boots</li> <li>• Steel ruler</li> <li>• Soft hammer</li> </ul>	128

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			straight machine metal shearing	precautions <ul style="list-style-type: none"> <li>• Clean tools, equipment, workpieces and work place</li> <li>• Store tools, equipment and remained materials</li> </ul>		<ul style="list-style-type: none"> <li>• Present the properties of metals</li> <li>• Identify parts and functions of shearing machines</li> <li>• Explain measuring techniques</li> <li>• Identify calculation methods for allowances</li> <li>• Describe speed selection</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• Safety precautions to be observed while performing the task</li> </ul>		
		(b) Performing circular shearing	<p><b>Demonstration:</b> Show the students how to identify, select, handle tools, equipment and materials to perform machine circular metal shearing</p> <p><b>Practical work:</b></p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>• Interpret working drawings</li> <li>• Select suitable materials and sizes</li> <li>• Take</li> </ul>	A circular machine sheared metal conforms to technical specifications	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should explain how to:</p> <ul style="list-style-type: none"> <li>• Take measurements</li> <li>• Mark workpieces</li> <li>• Perform machine setting</li> <li>• Perform circular</li> </ul>	The following tools, equipment and safety gears are available: <ul style="list-style-type: none"> <li>• Working drawing table</li> <li>• Shearing machine</li> <li>• Scriber</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			Organise the students in manageable groups and guide them to perform circular machine metal shearing	measurements <ul style="list-style-type: none"> <li>• Mark out</li> <li>• Check sharpness and tightness of blade</li> <li>• Cut the metal</li> <li>• Check accuracy of cuts</li> <li>• Observe safety precautions</li> <li>• Clean tools and equipment</li> <li>• Clean work place</li> <li>• Store tools and equipment safely</li> </ul>		machine shearing  <b>Principles:</b> The student should explain the principles of performing machine circular shearing  <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>• Describe properties of metals</li> <li>• Identify parts and functions of shearing machines</li> <li>• Describe the measuring techniques</li> <li>• Explain calculation methods for allowances</li> </ul> <b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Safety precautions to be observed while performing the task</li> </ul>	<ul style="list-style-type: none"> <li>• Straight edge</li> <li>• Measuring tape</li> <li>• Try square</li> <li>• Work bench</li> <li>• Centre punch</li> <li>• Ball pein hammer</li> <li>• Leather gloves</li> <li>• Leather apron</li> <li>• Safety boots</li> <li>• Steel ruler</li> <li>• Soft hammer</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
4 Performing soft soldering and Hard soldering on vehicle component and panels	4.1 Performing soft soldering	(a) Joining metal sheets by soldering	<p><b>Brainstorming:</b> Guide the students to define and explain the concept of soldering</p> <p><b>Demonstration:</b> Show the students how to identify, select, handle tools, equipment and material to join sheet metal by soldering</p> <p><b>Practical work:</b> Organise the students into manageable groups and guide them to perform sheet metal soft soldering</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>• Interpret working drawings</li> <li>• Choose suitable materials to be sorted</li> <li>• Select soldering tools</li> <li>• Follow soldering procedure</li> <li>• Maintain soldering heat</li> <li>• Remove flux residues</li> <li>• Check quality of seams</li> <li>• Attend housekeeping</li> <li>• Clean tools and equipment</li> <li>• Store the tools in safe place</li> <li>• Clean tools and</li> </ul>	A soft soldered metal joint formed conforms to technical specifications	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should explain how to:</p> <ul style="list-style-type: none"> <li>• Take measurements</li> <li>• Mark workpieces</li> <li>• Make joints</li> <li>• Perform metal soft soldering</li> </ul> <p><b>Principles:</b> The student should state the principles involved joining metals by soft soldering</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Distinguish the types of soft soldering materials and describe their properties</li> <li>• Describe the types of soldering gun and soldering iron</li> <li>• Describe joint preparation procedures</li> <li>• Explain soft soldering procedures</li> </ul>	<p>The following tools, equipment and safety gears are be available:</p> <ul style="list-style-type: none"> <li>• Drawing table/software</li> <li>• Steel ruler</li> <li>• Measuring tape</li> <li>• Soldering gun</li> <li>• Soldering iron</li> <li>• Solder wire</li> <li>• Soldering stick</li> <li>• Soldering flux</li> <li>• Blowing equipment</li> <li>• Divider</li> <li>• Protractor</li> <li>• Try square</li> <li>• Hammers</li> <li>• Scriber</li> <li>• Grooving tool</li> <li>• Bending machine</li> <li>• Seaming machines</li> <li>• Cutting machine</li> </ul>	75

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning 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 <ul style="list-style-type: none"> <li>• Store tools and equipment in safe custody</li> </ul>		<ul style="list-style-type: none"> <li>• Identify the major parts of soldering tools, equipment and machines and their applications</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• Safety precautions to be observed while soldering</li> </ul>	<ul style="list-style-type: none"> <li>• Forming tools</li> <li>• Overalls</li> <li>• Safety boots</li> <li>• Leather gloves</li> <li>• Anvil</li> <li>• Mallet</li> </ul>	
		(b) Joining pipe by soldering	<p><b>Brainstorming:</b> Guide the students to define and explain the concept of pipes soft solder</p> <p><b>Demonstration:</b> Show the students how to identify, select, handle tools, equipment and material Demonstrate how to join metal pipes by soldering</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>• Interpret working drawings</li> <li>• Choose suitable materials to be sorted</li> <li>• Follow soldering procedure</li> <li>• Maintain soldering heat</li> <li>• Remove flux</li> </ul>		<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should describe how to:</p> <ul style="list-style-type: none"> <li>• Take measurements</li> <li>• Mark workpieces</li> <li>• Make joints</li> <li>• Shape the pipes surfaces</li> <li>• Metal pipe soft soldering</li> </ul> <p><b>Principles:</b> The student</p>	<p>The following tools, equipment and safety gears are be available:</p> <ul style="list-style-type: none"> <li>• Drawing table/software</li> <li>• Steel ruler</li> <li>• Measuring tape</li> <li>• Soldering gun</li> <li>• Soldering iron</li> <li>• Soldering wire</li> <li>• Soldering flux</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning 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>Practical work:</b> Organise the students into manageable groups and guide them to perform soft soldering joint on pipes	residues <ul style="list-style-type: none"> <li>• Check quality of seams</li> <li>• Attend housekeeping</li> <li>• Clean tools and equipment</li> <li>• Store the tools in safe place</li> <li>• Clean tools and equipment</li> <li>• Store tools and equipment in safe custody</li> </ul>		should state the principles involved in joining metal pipes by soft soldering  <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>• Explain the types of soft soldering materials and their properties</li> <li>• Describe the joint preparation procedures</li> <li>• Identify pipe soft soldering procedures</li> <li>• Identify the major parts of soldering tools, equipment and machines and their applications</li> </ul> <b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Safety precaution to be observed while soldering pipes</li> </ul>	<ul style="list-style-type: none"> <li>• Blowing equipment</li> <li>• Divider</li> <li>• Protractor</li> <li>• Try square</li> <li>• Hammers</li> <li>• Scriber</li> <li>• Grooving tool</li> <li>• Bending machine</li> <li>• Seaming machines</li> <li>• Cutting machine</li> <li>• Forming tools</li> <li>• Overalls</li> <li>• Safety boots</li> <li>• Leather gloves</li> <li>• Anvil</li> <li>• Mallet</li> </ul>	
	4.2 Performin	(c) Joining metal into	<b>Brainstorming:</b> Guide the students to	<b>The student should be able</b>	A butt joint on Ferrous metal	<b>Knowledge evidence:</b>		80



Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
	g metal brazing and bronze welding	butt joint	<p>define and explain the concept of gas soldering</p> <p><b>Demonstration:</b> Show the students on how to identify, select, handle tools, equipment and material Demonstrate how to make butt joint by brazing and bronzing</p> <p><b>Practical work:</b> Organise the students into manageable groups and guide them to perform butt joint by hard soldering (brazing and bronzing)</p>	<p><b>to:</b></p> <ul style="list-style-type: none"> <li>• Interpret working drawings</li> <li>• Inspect gas welding equipment</li> <li>• Choose suitable materials</li> <li>• Assemble gas cylinder</li> <li>• Select nozzle sizes</li> <li>• Select welding rods (bronze rods)</li> <li>• Cut and file a plate</li> <li>• Align and tack weld work</li> <li>• Light the torch</li> <li>• Adjust welding flames</li> <li>• Set working pressure</li> <li>• Braze weld joint</li> </ul>	using bronze welded as per technical specifications	<p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should present the procedures for:</p> <ul style="list-style-type: none"> <li>• Taking measurements</li> <li>• Marking workpieces</li> <li>• Making joints</li> <li>• weld but joint by hard soldering/brazing</li> </ul> <p><b>Principles:</b> The student should discuss the principles of:</p> <ul style="list-style-type: none"> <li>• Obtaining good fusion on metals</li> <li>• Obtaining root penetration</li> <li>• But joint formation</li> </ul> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Describe metal properties</li> <li>• Explain bronze weld defects</li> <li>• Explain metallurgical effect on weldment</li> <li>• Elaborate different sizes of welding nozzle and application</li> <li>• Elaborate different</li> </ul>	<p>The following tools, equipment and safety gears are be available:</p> <ul style="list-style-type: none"> <li>• Welding booth</li> <li>• Welding bench</li> <li>• Oxy-acetylene plant</li> <li>• Pressure regulator</li> <li>• Welding torch</li> <li>• Hose pipe</li> <li>• Truck (trolley)</li> <li>• Cylinder key</li> <li>• Blow pipe spanner</li> <li>• Spark lighter</li> <li>• Ball pein hammer</li> <li>• Chisel</li> <li>• Wire brush</li> <li>• Centre punch</li> <li>• Tongs</li> <li>• Bronze rod</li> <li>• Flux</li> <li>• Emery paper</li> <li>• Tinted goggles</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
				<ul style="list-style-type: none"> <li>• Maintain movement of torch and bronze welding rod</li> <li>• Maintain angle of the torch and bronze rod</li> <li>• Clean tools and equipment</li> <li>• Store tools and equipment in safe custody</li> </ul>		sizes and types of bronze rods <ul style="list-style-type: none"> <li>• Differentiate types of flames and their application</li> </ul> <b>Circumstantial knowledge:</b> <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Safety precautions to be observed while welding</li> <li>• Firefighting techniques</li> <li>• Workshop rules and regulations</li> <li>• OSHA rules and regulations</li> <li>• OHS rules and regulations</li> </ul>	<ul style="list-style-type: none"> <li>• Leather apron</li> <li>• Leather gloves</li> <li>• Industrial boots</li> <li>• Canvas spat</li> <li>• Dust mask</li> </ul>	
		(b) Joining metal into lap joint	<b>Demonstration:</b> Show the students how to identify, select, handle tools, equipment and materials Demonstrate how to make lap joint by brazing and bronzing	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Interpret working drawings</li> <li>• Inspect gas welding equipment</li> <li>• Choose suitable materials</li> </ul>	A lap joint on Ferrous metal using bronze welded as per technical specifications	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The student should present the steps required to: <ul style="list-style-type: none"> <li>• Take measurements</li> <li>• Mark workpieces</li> <li>• Make joints</li> <li>• weld lap joint by hard soldering/brazing</li> </ul> <b>Principles:</b> The student	The following tools, equipment and safety gears are be available: <ul style="list-style-type: none"> <li>• Welding booth</li> <li>• Welding bench</li> <li>• Oxy-acetylene plant</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning 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>Practical work:</b> Organise the students into manageable groups and guide them perform lap joint by hard soldering	<ul style="list-style-type: none"> <li>• Assemble gas cylinder</li> <li>• Select nozzle sizes</li> <li>• Select welding rods (bronze rods)</li> <li>• Cut and file a plate</li> <li>• Align and tack weld work</li> <li>• Light the torch</li> <li>• Adjust welding flames</li> <li>• Set working pressure</li> <li>• Braze weld joint</li> <li>• Maintain movement of torch and bronze welding rod</li> <li>• Maintain angle of the torch and bronze rod</li> <li>• Clean tools and</li> </ul>		should explain the principles of: <ul style="list-style-type: none"> <li>• Obtaining good fusion on metals</li> <li>• Obtaining root penetration</li> <li>• Lap joint formation</li> <li>• Setting gas pressure</li> </ul> <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>• Describe metal properties</li> <li>• Describe bronze weld defects</li> <li>• Explain metallurgical effect on weldment</li> <li>• Explain different sizes of welding nozzle and application</li> <li>• Explain different sizes and types of bronze rods</li> <li>• Differentiate types of flames and their application</li> <li>• Discuss back fire flashback effect and prevention</li> </ul> <b>Circumstantial</b>	<ul style="list-style-type: none"> <li>• Pressure regulator</li> <li>• Welding torch</li> <li>• Hose pipe</li> <li>• Truck (trolley)</li> <li>• Cylinder key</li> <li>• Blow pipe spanner</li> <li>• Spark lighter</li> <li>• Ball peen hammer</li> <li>• Chisel</li> <li>• Wire brush</li> <li>• Centre punch</li> <li>• Tongs</li> <li>• Bronze rod</li> <li>• Flux</li> <li>• Emery paper</li> <li>• Tinted goggles</li> <li>• Leather apron</li> <li>• Leather gloves</li> <li>• Industrial boots</li> <li>• Canvas spat</li> <li>• Dust mask</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning 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 <ul style="list-style-type: none"> <li>• Store tools and equipment in safe custody</li> </ul>		<b>knowledge:</b> <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Safety precautions to be observed while welding</li> <li>• Firefighting techniques</li> <li>• Workshop rules and regulations</li> <li>• OSHA rules and regulations</li> <li>• OHS rules and regulations</li> </ul>		
		(c) Joining metal into flat position	<b>Brainstorming:</b> Guide the students to define and explain the concept of flat position hard soldering  <b>Demonstration:</b> Show the students how to identify, select, handle tools, equipment and materials Demonstrate how to make butt joint on flat (down hand) position by brazing and bronzing	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Interpret working drawings</li> <li>• Inspect gas welding equipment</li> <li>• Choose suitable materials</li> <li>• Assemble gas cylinder</li> <li>• Select nozzle sizes</li> <li>• Select welding rods (bronze rods)</li> </ul>	Ferrous metal joined on flat position using bronze welded as per technical specifications	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The student should highlight the procedures required to: <ul style="list-style-type: none"> <li>• Take measurements</li> <li>• Mark workpieces</li> <li>• Make joints</li> <li>• weld metals on flat position by hard soldering/brazing</li> <li>• Orient on different welding positions</li> </ul> <b>Principles:</b> The student should explain the principles of: <ul style="list-style-type: none"> <li>• Obtaining good fusion on metals</li> </ul>	The following tools, equipment and safety gears are be available: <ul style="list-style-type: none"> <li>• Welding booth</li> <li>• Welding bench</li> <li>• Oxy-acetylene plant</li> <li>• Pressure regulator</li> <li>• Welding torch</li> <li>• Hose pipe</li> <li>• Truck (trolley)</li> <li>• Cylinder key</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning 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>Practical work:</b> Organise the students into manageable groups and guide them to perform butt, lap and corner joint in flat position (down-hand) by hard soldering (brazing and bronze	<ul style="list-style-type: none"> <li>• Cut and file a plate</li> <li>• Align and tack weld work</li> <li>• Light the torch</li> <li>• Adjust welding flames</li> <li>• Set working pressure</li> <li>• Braze weld joint</li> <li>• Maintain movement of torch and bronze welding rod</li> <li>• Maintain angle of the torch and bronze rod</li> <li>• Clean tools and equipment</li> <li>• Store tools and equipment in safe custody</li> </ul>		<ul style="list-style-type: none"> <li>• Obtaining root penetration</li> </ul> <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>• Describe metal properties</li> <li>• Show bronze weld defects</li> <li>• Identify metallurgical effect on weldment</li> <li>• Explain different sizes of welding nozzle and application</li> <li>• Explain different sizes and types of bronze rods</li> <li>• Advantages and disadvantages of bronze welding</li> <li>• Differentiate types of flames and their application</li> </ul> <b>Circumstantial knowledge:</b> <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Safety precautions to be observed while</li> </ul>	<ul style="list-style-type: none"> <li>• Blow pipe spanner</li> <li>• Spark lighter</li> <li>• Ball peen hammer</li> <li>• Chisel</li> <li>• Wire brush</li> <li>• Centre punch</li> <li>• Tongs</li> <li>• Tinted goggles</li> <li>• Leather apron</li> <li>• Leather gloves</li> <li>• Industrial boots</li> <li>• Canvas spat</li> <li>• Dust mask</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
						welding <ul style="list-style-type: none"> <li>• Firefighting techniques</li> <li>• Workshop rules and regulations</li> <li>• OSHA rules and regulations</li> <li>• OHS rules and regulations</li> </ul>		

## Form Two

**Table 4:** Detailed Contents for Form Two

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
1.0  Performing vehicle general check-up	1.1 carrying out vehicle general check up	(a)  Checking for damage and set up	<p><b>Brainstorming:</b> Guide the students to explain the concept of vehicle check up and setup</p> <p><b>Discussion:</b> Guide the students to carry out vehicle body inspection for damages</p> <p><b>Field visit:</b> Under teacher supervision, visit the car park and identify vehicle body damages</p> <p><b>Practical work:</b></p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>• Check the general vehicle set up</li> <li>• Identify faults</li> <li>• Identify damages</li> <li>• Identify tear and wear</li> <li>• Identify miss alignment</li> <li>• Identify cracks</li> <li>• Learn inspection procedures</li> <li>• Use checklist</li> <li>• Use manufactures manual</li> <li>• Operate various tools, equipment and machines</li> <li>• List down body and chassis deformations</li> </ul>	General vehicle standard conforms to manufacturer's specifications	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should explain how to:</p> <ul style="list-style-type: none"> <li>• Inspect a vehicle body</li> <li>• Identify faults/problems</li> <li>• Use proper tools, equipment and machines</li> <li>• Record and report the problem</li> </ul> <p><b>Principles:</b> The student should explain the principles of:</p> <ul style="list-style-type: none"> <li>• Vehicle inspection and check up</li> <li>• Components and</li> </ul>	<p>The following tools, equipment and safety gears are be available:</p> <ul style="list-style-type: none"> <li>• Vehicle layout catalogue</li> <li>• Components/system checklist</li> <li>• Inspection pit</li> <li>• Overall</li> <li>• Helmet</li> <li>• Industrial boots</li> <li>• Hammer</li> <li>• Set of Screwdrivers</li> <li>• Gloves</li> <li>• Cotton rag</li> <li>• Clear safety goggles</li> <li>• Types of pressure gauge</li> <li>• Levers</li> <li>• Vehicles</li> </ul>	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	Product/ Services Assessment	Knowledge Assessment		
			Organise the students into groups to perform vehicle body checkup as per standards	<ul style="list-style-type: none"> <li>• Clean tools and equipment</li> <li>• Store tools and equipment in safe custody</li> </ul>		systems set up <ul style="list-style-type: none"> <li>• Vehicle layout</li> </ul> <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>• Define the concept of vehicle checkup and setups</li> <li>• Explain vehicle body layout</li> <li>• Identify vehicle components arrangement</li> <li>• Reveal types of damages</li> <li>• Inspect general vehicle standards</li> <li>• Identify body and chassis deformations</li> <li>• Prepare general service schedule plan</li> <li>• Describe how to diagnose and troubleshoot procedures</li> </ul> <b>Circumstantial knowledge</b>  <b>Detailed knowledge</b>	<ul style="list-style-type: none"> <li>• Inspection light</li> <li>• Tyre pressure gauge</li> <li>• Measuring tape</li> </ul>	



Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning 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>about</b> <ul style="list-style-type: none"> <li>• Workshop rules and regulations</li> <li>• TBS vehicle inspection standards</li> <li>• Vehicle technical specifications</li> <li>• Manufacturers manuals</li> <li>• Safety rules and regulations</li> </ul>		
		(b) Checking for missing parts, bolts and nuts for tightness	<b>Brainstorming:</b> Guide the students to explain the concept of fasteners on the vehicle body  <b>Discussion:</b> Under teacher supervision, discuss on possible parts, components and fasteners that can be missed on the vehicle	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Perform general vehicle checkup and set up</li> <li>• Identify missing parts and components</li> <li>• Identify loose fasteners</li> <li>• Identify tear and wear</li> <li>• Identify miss alignment</li> <li>• Learn inspection procedures</li> <li>• Use checklist</li> </ul>	Vehicle parts and tightening conforms to manufacturer's specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain how to: <ul style="list-style-type: none"> <li>• Inspect for missing parts of a vehicle</li> <li>• Inspect for loose fasteners</li> </ul> <b>Principles:</b> The student should explain the principles of:	The following tools, equipment and safety gears are be available: <ul style="list-style-type: none"> <li>• Vehicle layout catalogue</li> <li>• Components/systems checklist</li> <li>• Inspection pit</li> <li>• Overall</li> <li>• Helmet</li> <li>• Industrial boots</li> <li>• Hammer</li> <li>• Set of Screwdrivers</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			Provide reason  <b>Practical work:</b> Organise the students into groups to check for missing parts, components and fasteners on vehicle body	<ul style="list-style-type: none"> <li>• Use manufactures manual</li> <li>• Operate various tools, equipment and machines</li> <li>• Clean tools and equipment</li> <li>• Store tools and equipment in safe custody</li> </ul>		<ul style="list-style-type: none"> <li>• Inspection of vehicle parts and components</li> <li>• Components and systems set up</li> <li>• Vehicle layout</li> <li>• Tightening fasteners</li> </ul> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Explain vehicle body layout</li> <li>• Describe vehicle components arrangement</li> <li>• Present general vehicle standards</li> <li>• Identify missing parts of vehicle body</li> <li>• Describe tightening procedures</li> </ul> <p><b>Circumstantial knowledge</b></p> <p><b>Detailed knowledge about</b></p> <ul style="list-style-type: none"> <li>• Safe handling of vehicle</li> <li>• Vehicle inspection</li> </ul>	<ul style="list-style-type: none"> <li>• Gloves</li> <li>• Cotton rag</li> <li>• Clear safety goggles</li> <li>• Types of pressure gauge</li> <li>• Levers</li> <li>• Vehicles</li> <li>• Inspection light</li> <li>• Tyre pressure gauge</li> <li>• Measuring tape</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
						as per technical specifications <ul style="list-style-type: none"> <li>• Parts tightening specifications</li> <li>• Safety rules and regulations</li> </ul>		
		(c) Checking tyre pressure and wear	<b>Brainstorming:</b> Guide the students to explain the concept of tyre wear and pressure inflation  <b>Discussion:</b> Under teacher supervision, discuss on tyres wear and pressure inflation  Provide the side effects  <b>Practical work:</b> Organise the students into groups to check for tyre wear and pressure	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Perform general checkup and set up</li> <li>• Identify missing wheel or wheel nuts</li> <li>• Identify loosen wheel nuts</li> <li>• Identify tyre tear and wear</li> <li>• Identify miss alignment</li> <li>• Learn inspection procedures</li> <li>• Check tyre wear and pressure</li> <li>• Perform tyre inflation</li> <li>• Use checklist</li> <li>• Use manufactures manual</li> <li>• Operate various</li> </ul>	Tyre condition and pressure conform to manufacturer's specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should describe how to: <ul style="list-style-type: none"> <li>• Inspect tyre wear</li> <li>• Inspect cracks</li> <li>• Inspect for loosening wheel nuts</li> <li>• Check for tyre pressure</li> <li>• Inflate tyre</li> </ul> <b>Principles:</b> The student should explain the principles of checking tyre wear and pressure  <b>Theories:</b> The	The following tools, equipment and safety gears are be available: <ul style="list-style-type: none"> <li>• Components/systems checklist</li> <li>• Inspection pit</li> <li>• Overall</li> <li>• Helmet</li> <li>• Industrial boots</li> <li>• Hammer</li> <li>• Set of Screwdrivers</li> <li>• Gloves</li> <li>• Cotton rag</li> <li>• Clear safety goggles</li> <li>• Air compressor</li> <li>• Depth gauge</li> <li>• Types of pressure gauge</li> <li>• Levers</li> <li>• Vehicles</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
				tools, equipment and machines <ul style="list-style-type: none"> <li>• Clean tools and equipment</li> <li>• Store tools and equipment in safe custody</li> </ul>		student should: <ul style="list-style-type: none"> <li>• Define the concept of tyre wear and pressure inflation</li> <li>• Explain wheel and tyre</li> <li>• Elaborate type of tyre</li> <li>• Enumerate materials used in tyre construction</li> <li>• Reveal tyre damages and cracks</li> <li>• Explain tyre wear</li> <li>• Explain tyre inflation</li> <li>• Analyse tyre specifications</li> </ul> <b>Circumstantial knowledge</b> <b>Detailed knowledge about</b> <ul style="list-style-type: none"> <li>• Safe handling of vehicle</li> <li>• Vehicle inspection as per technical specifications</li> <li>• Parts tightening</li> </ul>	<ul style="list-style-type: none"> <li>• Inspection light</li> <li>• Tyre pressure gauge</li> <li>• Measuring tape</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
						specifications • Safety rules and regulations		
		(d)Checking vehicle level	<b>Brainstorming:</b> Guide the students to explain the concepts of vehicle level checking  <b>Discussion:</b> Under teacher supervision, discuss on vehicle level and means of identifying unlevel vehicle  Provide the side effects  <b>Simulation:</b> Use graphics, animations and videos to simulate behaviour of levelled and unlevelled	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Perform general checkup and set up</li> <li>• Check for miss-alignment</li> <li>• Measure ride height/ground clearance</li> <li>• Identify tyre size and specifications</li> <li>• Check for suspension system</li> <li>• Check tyre wear and pressure</li> <li>• Perform tyre inflation</li> <li>• Use checklist</li> <li>• Use manufacturer's manual</li> <li>• Operate various tools, equipment and machines</li> <li>• Clean tools and</li> </ul>	Vehicle level conforms to manufacturer's specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain how to: <ul style="list-style-type: none"> <li>• Inspect suspension system</li> <li>• Inspect for bent chassis frame</li> <li>• Check tyre pressure</li> <li>• Perform vehicle levelling</li> </ul> <b>Principles:</b> The student should state the principles of performing vehicle level check  <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>• Define the concept of vehicle level</li> <li>• Explain vehicle</li> </ul>	The following tools, equipment and safety gears are available: <ul style="list-style-type: none"> <li>• Components/systems checklist</li> <li>• Inspection pit</li> <li>• Overall</li> <li>• Helmet</li> <li>• Industrial boots</li> <li>• Hammer</li> <li>• Set of Screwdrivers</li> <li>• Gloves</li> <li>• Cotton rag</li> <li>• Clear safety goggles</li> <li>• Air compressor</li> <li>• Depth gauge</li> <li>• Types of pressure gauge</li> <li>• Levers</li> <li>• Vehicles</li> <li>• Inspection light</li> <li>• Tyre pressure gauge</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			vehicles  <b>Practical work:</b>  By using proper tools and equipment, guide the students in manageable groups to check for vehicle level	equipment • Store tools and equipment in safe custody		body layout • Identify sprang and unsprang vehicle parts • Explain vehicle ground clearance • Describe vehicle body alignment <b>Circumstantial knowledge</b>  <b>Detailed knowledge about</b>  • Safe handling of vehicle • Vehicle inspection as per technical specifications • Parts tightening specifications • Safety rules and regulations	• Measuring tape • Spirit level	
	1.2 Checking electrical wiring system	(a) Checking electrical switches and relays	<b>Brainstorming:</b>  Guide students to explain the concepts of vehicle electrical wiring	<b>The student should be able to:</b>  • Select relevant safety gears, tools and equipment • Use service	The electrical switches and relays conform to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should	The following tools, equipment and safety gears are be available:  • Vehicle	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	Product/ Services Assessment	Knowledge Assessment		
			<p>system</p> <p><b>Simulation:</b></p> <p>Use graphics, animations and videos to simulate working principles of vehicle electric switches and relays</p> <p><b>Practical work:</b></p> <p>Guide the students to check for faulty switches and relays</p>	<p>manual</p> <ul style="list-style-type: none"> <li>• Repair electrical parts</li> <li>• Check relays</li> <li>• Check electrical switches light</li> <li>• Observe safety precautions</li> <li>• Clean tools, equipment and work place</li> <li>• Store tools and equipment</li> </ul>		<p>elaborate how to:</p> <ul style="list-style-type: none"> <li>• Check relays and switches</li> <li>• Measure electrical components</li> </ul> <p><b>Principles:</b> The student should state the principles of checking and performing measurements of relays and switches</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Define the concept of vehicle electrical wiring system</li> <li>• Explain the layout of electrical system</li> <li>• Define light combined switch</li> <li>• Explain the functions of relays and switches</li> <li>• Distinguish types of switches and relays</li> </ul> <p><b>Circumstantial</b></p>	<ul style="list-style-type: none"> <li>• Switches</li> <li>• Relays</li> <li>• Electrical circuit training modal</li> <li>• Tool kit</li> <li>• Set of screw driver</li> <li>• Combination pliers</li> <li>• Circuit cleaner</li> <li>• Multimeter</li> <li>• Test light</li> <li>• Wire stripper</li> <li>• Test lamp</li> <li>• Overall</li> <li>• Safety boot</li> <li>• Gloves</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning 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>knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Safety precautions to be observed while doing the task</li> </ul>		
		(b) Checking lighting system	<b>Brainstorming:</b>  Guide the students to define and describe procedures for checking light system  <b>Simulation:</b>  Use graphics, animations and videos to simulate how lighting system works  <b>Practical work:</b>  Organise the	<b>The students should be able to:</b> <ul style="list-style-type: none"> <li>• Interpret lighting circuit diagrams</li> <li>• Check signal turning and hazard light circuit</li> <li>• Check reverse light circuit</li> <li>• Check brake light circuit</li> <li>• Observe safety precautions</li> <li>• Clean tools, equipment and workplace</li> <li>• Store tools and equipment</li> </ul>	The light system conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should provide a detailed account on how to: <ul style="list-style-type: none"> <li>• Check lighting system</li> <li>• Measure electrical components</li> </ul> <b>Principles:</b> The student should explain the principles of checking lighting system  <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>• Explain layout of</li> </ul>	The following tools, equipment and safety gears are available: <ul style="list-style-type: none"> <li>• Vehicle</li> <li>• Switches</li> <li>• Relays</li> <li>• Electrical circuit training modal</li> <li>• Tool kit</li> <li>• Set of screw driver</li> <li>• Combination pliers</li> <li>• Circuit cleaner</li> <li>• Multimeter</li> <li>• Test light</li> <li>• Wire stripper</li> <li>• Test lamp</li> <li>• Overall</li> </ul>	



Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			students into manageable groups and guide them to check vehicle light system			electrical system <ul style="list-style-type: none"> <li>• Distinguish types of electrical lights</li> <li>• Elaborate the functions of electrical system</li> <li>• Elaborate functions of lighting system</li> </ul> <b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Safety precautions to be observed while doing the task</li> </ul>	<ul style="list-style-type: none"> <li>• Safety boot</li> <li>• Gloves</li> <li>• ICT based learning</li> </ul>	
	1.3 Checking accessories circuit and components	(a) Checking horn circuit	<b>Brainstorming:</b>  Guide the students to define and describe procedures for checking the horn circuit  <b>Simulation:</b>  Use graphics, animations and	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Select tools equipment and PPE</li> <li>• Interpret auxiliary circuit diagrams</li> <li>• Use the service manual</li> <li>• Diagnose horn circuit and</li> </ul>	Electrical horn circuits conform as per vehicle manufacturer's specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain how to: <ul style="list-style-type: none"> <li>• Check horn circuit</li> <li>• Troubleshoot/ diagnose horn circuit faulty</li> </ul>	The following tools, equipment and safety gears are available: <ul style="list-style-type: none"> <li>• Vehicle</li> <li>• Wire brush</li> <li>• Tool kit</li> <li>• Multimeter</li> <li>• Safety clear glasses</li> </ul>	107

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			<p>videos to simulate how horn circuit works</p> <p><b>Practical work:</b></p> <p>Organise the students into manageable groups and guide them to check horn circuit</p>	<p>components system</p> <ul style="list-style-type: none"> <li>• Observe safety precautions</li> <li>• Clean tools, equipment and workplace</li> <li>• Store tools and equipment</li> </ul>		<p><b>Principles:</b> The student should explain the principles of horn circuit operating</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Distinguish types of horn</li> <li>• Explain the functions of horn</li> <li>• Explain layout of horn circuits</li> <li>• Apply horn</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• Safety precautions while checking horn circuit and components</li> <li>• Safe handling of work tools and equipment</li> <li>• Waste disposal</li> </ul>	<ul style="list-style-type: none"> <li>• Overall</li> <li>• Plastic gloves</li> <li>• Safety boots</li> <li>• Work bench</li> <li>• Gloves</li> <li>• Respiratory mask</li> <li>• Multimeter</li> <li>• Test light</li> <li>• Set of different wire connectors</li> <li>• Test lamp</li> <li>• Wire brush</li> <li>• Workbench</li> </ul>	
		(b) Checking the wiper and windscreen	<p><b>Brainstorming:</b></p> <p>Guide the</p>	<b>The student should be able to:</b>	Wiper and windscreen washer circuit	<b>Knowledge evidence:</b>	This element can be achieved at school	

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				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
		washer circuit	<p>students to define and describe procedures for checking Wiper and windscreen washer circuit</p> <p><b>Simulation:</b></p> <p>Use graphics, animations and videos to simulate how wiper system and wind screen washer works</p> <p><b>Practical work:</b></p> <p>Organise the students into manageable groups and ask them to check Wiper and windscreen washer circuit</p>	<ul style="list-style-type: none"> <li>• Select tools equipment and PPE</li> <li>• Interpret wiper and windscreen washer circuit diagrams</li> <li>• Use service manual</li> <li>• Diagnose wiper and windscreen washer circuits and components system</li> <li>• Observe safety precautions</li> <li>• Clean tools, equipment and work place</li> <li>• Store tools and equipment</li> </ul>	and components conform as per vehicle manufacturer's specifications	<p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Identify wiper circuit</li> <li>• Identify windscreen washer circuit</li> <li>• Explain how to check wiper and windscreen circuits</li> </ul> <p><b>Principles:</b> The student should state the principles of operating of wiper and windscreen washer circuits</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Distinguish types Wiper and windscreen washer</li> <li>• Explain functions of wiper and windscreen washer circuit</li> </ul>	<p>The following tools, equipment and safety gears are be available:</p> <ul style="list-style-type: none"> <li>• Vehicle</li> <li>• Wire brush</li> <li>• Tool kit</li> <li>• Multimeter</li> <li>• Safety clear glasses</li> <li>• Overall</li> <li>• Plastic gloves</li> <li>• Safety boots</li> <li>• Work bench</li> <li>• Gloves</li> <li>• Respiratory mask</li> <li>• Multimeter</li> <li>• Set of different wire connectors</li> <li>• Test lamp</li> <li>• Service manual</li> <li>• Clamp on meter</li> <li>• Wire brush</li> <li>• Soldering gun</li> <li>• Work bench</li> </ul>	

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				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
						<ul style="list-style-type: none"> <li>• Elaborate the operation principle of wiper and windscreen washer circuit</li> <li>• Elaborate the importance of wiper and windscreen in the vehicle</li> <li>• Reveal the layout of wiper and windscreen washer circuit</li> <li>• Describe the Application of Wiper and windscreen washer system</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• Safety precautions while Wiper and windscreen washer circuit</li> <li>• Safe handling of</li> </ul>		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
						work tools and equipment • Waste disposal		
		(c) Checking the defogger's circuit	<p><b>Brainstorming:</b></p> <p>Guide the students to define and describe procedures for checking the defogger circuit</p> <p><b>Simulation:</b></p> <p>Use graphics, animations and videos to simulate how defoggers system works</p> <p><b>Practical work:</b></p> <p>Organise the students into manageable groups and guide them to check the</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>• Select tools equipment and PPE</li> <li>• Interpret defogger circuit</li> <li>• Diagrams</li> <li>• Use the service manual</li> <li>• Diagnose defogger circuit and components</li> <li>• Observe safety precautions</li> <li>• Clean tools, equipment and workplace</li> <li>• Store tools and equipment</li> </ul>	Defogger circuit circuits conform as the vehicle manufacturer's specifications	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Differentiate between rear and front defogger circuits</li> <li>• Describe ow to check defogger's circuits</li> </ul> <p><b>Principles:</b> The student should state the principles of operating the defogger system</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Distinguish types defogger circuit</li> <li>• Explain functions of defogger circuit</li> </ul>	<p>The following tools, equipment and safety gears are be available:</p> <ul style="list-style-type: none"> <li>• Vehicle</li> <li>• Wire brush</li> <li>• Tool kit</li> <li>• Multimeter</li> <li>• Safety clear glasses</li> <li>• Overall</li> <li>• Plastic gloves</li> <li>• Safety boots</li> <li>• Work bench</li> <li>• Gloves</li> <li>• Respiratory mask</li> <li>• Set of different wire connectors</li> <li>• Test lamp</li> <li>• Service manual</li> <li>• Wire brush</li> <li>• Workbench</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			defogger circuit			<ul style="list-style-type: none"> <li>• Elaborate the operation principle of defogger circuit</li> <li>• Explain the layout of defogger circuit</li> <li>• Apply defogger system</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• Safety precautions while defogger circuit</li> <li>• and components</li> <li>• Safe handling of work tools and equipment</li> <li>• Waste disposal</li> </ul>		
	1.4 Maintaining batteries	(a) Preparing a new battery for vehicle use	<p><b>Brainstorming:</b></p> <p>Guide the students to define and describe vehicle battery</p> <p><b>Demonstration :</b></p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>• Prepare a new battery for vehicle use</li> <li>• Select tools and equipment</li> <li>• Remove the battery from the</li> </ul>	A new battery prepared as per technical specifications	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should explain how to:</p> <ul style="list-style-type: none"> <li>• Check electrolyte</li> </ul>	<p>The following tools, equipment and safety gears are available:</p> <ul style="list-style-type: none"> <li>• Vehicle/training modal</li> <li>• Battery charger</li> </ul>	107

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				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			<p>Show the students how to identify, select, handle tools, equipment and materials Demonstrate how to prepare a new battery ready for use</p> <p><b>Practical work:</b> Organise the students into manageable groups and guide them to prepare new battery for use</p>	<p>vehicle</p> <ul style="list-style-type: none"> <li>• Check the battery state of charge</li> <li>• Service battery</li> <li>• Mount battery to vehicle</li> <li>• Test battery</li> <li>• Observe safety precautions</li> <li>• Clean tools, equipment and work place</li> <li>• Store tools and equipment</li> </ul>		<ul style="list-style-type: none"> <li>level</li> <li>• Check battery voltage</li> <li>• Charge battery</li> <li>• Check battery state of charge</li> <li>• Check battery capacity</li> <li>• Mount battery to the vehicle</li> </ul> <p><b>Principles:</b> The student should explain the principles of maintaining new battery</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Explain functions of batteries</li> <li>• Distinguish types of batteries</li> <li>• Explain battery chemical reactions</li> <li>• Identify battery faults</li> <li>• Describe how to Handle the batteries properly</li> </ul>	<ul style="list-style-type: none"> <li>• Battery capacity analyser</li> <li>• Hydrometer</li> <li>• High-rate discharge tester</li> <li>• Wire brush</li> <li>• Tool kit</li> <li>• Multimeter</li> <li>• Plastic container</li> <li>• Thermometer</li> <li>• Water sucker</li> <li>• Safety clear glasses</li> <li>• Overall</li> <li>• Plastic gloves</li> <li>• Safety boots</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning 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>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Safety precautions to be observed while doing the task</li> </ul>		
		(b) Removing and refitting the battery in a vehicle	<b>Brainstorming:</b>  Guide the students to define and describe procedures of vehicle battery removal and refit  <b>Demonstration :</b> Show the students how to identify, select, handle tools, equipment and materials, and refitting the battery on the vehicle	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Select tools, equipment and PPE</li> <li>• Remove battery from vehicle</li> <li>• Mount battery to vehicle</li> <li>• Observe safety precautions</li> <li>• Clean tools, equipment and work place</li> <li>• Store tools and equipment</li> </ul>	A battery was removed and refitted in a vehicle body as per technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain how to: <ul style="list-style-type: none"> <li>• Remove/dismount battery from the vehicle</li> <li>• Check electrolyte level</li> <li>• Check battery voltage</li> <li>• Check battery state of charge</li> <li>• Check battery capacity</li> </ul> <b>Principles:</b> The	The following tools, equipment and safety gears are available: <ul style="list-style-type: none"> <li>• Vehicle/training modal</li> <li>• Set of spanners</li> <li>• Battery charger</li> <li>• Battery capacity analyser</li> <li>• Hydrometer</li> <li>• High-rate discharge tester</li> <li>• Wire brush</li> <li>• Tool kit</li> <li>• Multimeter</li> <li>• Plastic container</li> <li>• Thermometer</li> <li>• Water sucker</li> <li>• Safety clear</li> </ul>	



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				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			<b>Practical work:</b>  Organise the students in manageable groups and guide them to remove, maintain, store and refit the battery on the vehicle			student should elaborate the principles of maintaining the vehicle battery  <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>• Explain the functions of batteries</li> <li>• Distinguish types of batteries</li> <li>• Explain battery chemical reactions</li> <li>• Reveal battery faults</li> <li>• Describe how to handle batteries accordingly</li> <li>• Describe how to perform battery dismounting and mounting procedures</li> </ul> <b>Circumstantial knowledge:</b>  <b>Detailed knowledge</b>	glasses <ul style="list-style-type: none"> <li>• Overall</li> <li>• Plastic gloves</li> <li>• Safety boots</li> </ul>	

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				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
						<b>about:</b> <ul style="list-style-type: none"> <li>• Safety precautions to be observed while doing the task</li> <li>• First aid</li> <li>• Waste disposal</li> </ul>		
		(c) Performing battery measurements	<b>Brainstorming:</b> guide the students to describe vehicle battery measurements  <b>Demonstration :</b> Show the students how to identify, select, handle tools, equipment and materials, and performing battery measurements for the vehicle use  <b>Practical work:</b>	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Select tools equipment and PPE</li> <li>• Test battery</li> <li>• Measure battery voltage</li> <li>• Measure electrolyte-specific gravity and level</li> <li>• measure battery state of charge</li> <li>• measure battery capacity</li> <li>• Service battery</li> <li>• Observe safety precautions</li> <li>• Clean tools, equipment and workplace</li> </ul>	Battery measurements performed as per technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain how to: <ul style="list-style-type: none"> <li>• Remove/dismount battery from the vehicle</li> <li>• Measure battery voltage</li> <li>• measure electrolyte-specific gravity and level</li> <li>• measure battery state of charge</li> <li>• measure battery capacity</li> </ul>	The following tools, equipment and safety gears are available: <ul style="list-style-type: none"> <li>• Vehicle/training modal</li> <li>• Set of spanners</li> <li>• Battery charger</li> <li>• Battery capacity analyser</li> <li>• Hydrometer</li> <li>• High-rate discharge tester</li> <li>• Wire brush</li> <li>• Tool kit</li> <li>• Multimeter</li> <li>• Plastic container</li> <li>• Thermometer</li> <li>• Water sucker</li> </ul>	

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				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			Organise the students in manageable groups and guide them to remove battery from the vehicle body and perform measurements	<ul style="list-style-type: none"> <li>• Store tools and equipment</li> </ul>		<p><b>Principles:</b> The student should explain the principles of maintaining batteries</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Define battery measurement</li> <li>• Explain the functions of batteries</li> <li>• Distinguish types of batteries</li> <li>• Describe battery chemical reactions</li> <li>• Reveal battery faults</li> <li>• Handle batteries accordingly</li> <li>• Elaborate how to perform battery dismounting and mounting procedures</li> </ul> <p><b>Circumstantial knowledge:</b></p>	<ul style="list-style-type: none"> <li>• Safety clear glasses</li> <li>• Overall</li> <li>• Plastic gloves</li> <li>• Safety boots</li> </ul>	

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						<b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>Safety precautions to be observed while doing the task</li> <li>First aid</li> <li>Waste disposal</li> </ul>		
		(d) Performing battery charging	<b>Brainstorming:</b> Guide the students to describe vehicle battery charging  <b>Demonstration :</b> Show the students how to identify, select, handle tools, equipment and materials, and perform the battery charging  <b>Practical work:</b> Organise the students into manageable groups and	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>Select tools equipment and PPE</li> <li>Check the battery's state of charge</li> <li>Select charging machine</li> <li>Select charging method</li> <li>Connect batteries for charging</li> <li>Perform battery charging</li> <li>Test battery</li> <li>Observe</li> </ul>	Battery charged performed as per technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should elaborate how to: <ul style="list-style-type: none"> <li>Check battery voltage</li> <li>Remove/dismount battery from the vehicle</li> <li>Check electrolyte-specific gravity and level</li> <li>Check battery state of charge</li> <li>Check battery capacity</li> <li>Connect battery</li> </ul>	The following tools, equipment and safety gears are available: <ul style="list-style-type: none"> <li>Vehicle/training modal</li> <li>Set of spanner</li> <li>Battery charger</li> <li>Battery capacity analyser</li> <li>Hydrometer</li> <li>High-rate discharge tester</li> <li>Wire brush</li> <li>Tool kit</li> <li>Multimeter</li> <li>Plastic container</li> <li>Thermometer</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			guide them to charge different types of the vehicle batteries	safety precautions <ul style="list-style-type: none"> <li>• Store tools and equipment</li> </ul>		for charging <ul style="list-style-type: none"> <li>• Charge the battery</li> </ul> <p><b>Principles:</b> The student should state the principles of charging the vehicle batteries</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Define battery measurement</li> <li>• Explain the functions of batteries</li> <li>• Handle batteries properly</li> <li>• Perform battery dismounting and mounting procedures</li> <li>• Explain battery charging</li> <li>• Describe methods of battery charging</li> </ul> <p><b>Circumstantial</b></p>	<ul style="list-style-type: none"> <li>• Water sucker</li> <li>• Safety clear glasses</li> <li>• Overall</li> <li>• Plastic gloves</li> <li>• Safety boots</li> </ul>	

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				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
						<b>knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>Safety precautions to be observed during charging</li> <li>Waste disposal</li> </ul>		
2 Performing gas welding on vehicle body panels	2.1 Carrying out gas welding on body panels	(a) Welding metals in butt joint on horizontal position	<b>Brainstorming:</b>  Guide the students to explain the concept of gas welding <b>Simulation:</b>  Provide students with a number of videos to simulate various techniques of welding metals in different joints on different positions <b>Demonstration:</b>  Organise students in groups and demonstrate to them how to weld metals in butt joint	<b>The students should be able to:</b> <ul style="list-style-type: none"> <li>Inspect gas welding equipment</li> <li>Assemble gas cylinder</li> <li>Select nozzle sizes</li> <li>Select welding rods</li> <li>Cut plate to specifications</li> <li>Light the torch and Adjust welding</li> </ul>	Workpieces welded in butt joint on horizontal position conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain how to: <ul style="list-style-type: none"> <li>Weld metals by gas flame</li> <li>Weld metals in butt joint</li> <li>Weld on horizontal position</li> <li>Set welding flame</li> </ul> <b>Principles:</b> The student should explain the principles of welding metals in butt joint on horizontal position  <b>Theories:</b> The student should:	The following tools, equipment and safety gears are available: <ul style="list-style-type: none"> <li>Oxy-acetylene plant</li> <li>Pressure regulator</li> <li>Welding torch</li> <li>Hose pipes</li> <li>Gas trolley</li> <li>Cylinder key</li> <li>Spark lighter</li> <li>Ball peen hammer</li> <li>Chisel</li> <li>Wire brush</li> <li>Centre punch</li> <li>Leather gloves</li> </ul>	90

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				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			on horizontal position  <b>Practical work:</b>  Organise the students in groups and guide them to weld metals in butt joint on horizontal position	flames <ul style="list-style-type: none"> <li>Align a workpiece in butt joint on horizontal position</li> <li>Weld the joint</li> <li>Keep on maintaining movement of torch and rod</li> </ul>		<ul style="list-style-type: none"> <li>Identify parts of gas welding equipment and their functions</li> <li>Describe recommended working flames and pressure</li> <li>Show side effects of back fire and flash back</li> <li>Explain different welding procedures and techniques</li> </ul> <b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>Safety precautions to be observed while doing the task</li> </ul>	<ul style="list-style-type: none"> <li>Clear goggles</li> <li>Angle grinder</li> <li>Bench vice</li> <li>Safety boots</li> <li>Canvas spats</li> <li>Dust mask</li> <li>Overalls</li> </ul>	
		(b) Welding metals into lap joint on horizontal position	<b>Demonstration :</b>  Organise students in groups and demonstrate to them how to weld metals in	<b>The students should be able to:</b> <ul style="list-style-type: none"> <li>Inspect gas welding equipment</li> <li>Assemble gas cylinder</li> <li>Select nozzle</li> </ul>	Workpieces welded in lap joint on horizontal position conforms to technical specifications	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <ul style="list-style-type: none"> <li><b>Methods used:</b> The student should elaborate how to: Weld metals by gas</li> </ul>	This element can be achieved at a work place, training institution or school workshops and premises.  The following tools, equipment and	

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				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			lap joint on horizontal position  <b>Practical work:</b>  Organise the students in groups and guide them to weld metals in lap joint on horizontal position	sizes <ul style="list-style-type: none"> <li>Select welding rods</li> <li>Cut plate to specifications</li> <li>Light the torch and Adjust welding flames</li> <li>Align a workpiece in lap joint on horizontal position</li> <li>Weld the joint</li> <li>Keep on maintaining movement of torch and rod</li> </ul>		flame <ul style="list-style-type: none"> <li>Weld metals in lap joint</li> <li>Weld on horizontal position</li> <li>Set welding flame</li> </ul> <b>Principles:</b> The student should state the principles of welding metals into lap joint on horizontal position:  <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>Identify parts of gas welding equipment and their functions</li> <li>Explain recommended working flames and pressure</li> <li>Describe the side effects of back fire and flash back</li> <li>Enumerate</li> </ul>	safety gears are be available:  <ul style="list-style-type: none"> <li>Oxy-acetylene plant.</li> <li>Pressure regulator.</li> <li>Welding torch.</li> <li>Hose pipes.</li> <li>Gas trolley.</li> <li>Cylinder key.</li> <li>Spark lighter.</li> <li>Ball peen hammer.</li> <li>Chisel.</li> <li>Wire brush.</li> <li>Centre punch.</li> <li>Leather gloves.</li> <li>Clear goggles.</li> <li>Angle grinder.</li> <li>Bench vice.</li> <li>Safety boots.</li> <li>Canvas spats.</li> <li>Dust mask.</li> <li>Overalls.</li> </ul>	



Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
						<p>different welding procedures and techniques</p> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>Safety precautions to be observed while doing the task</li> </ul>		
		(c) Welding metals in corner joint on vertical position	<p><b>Demonstration :</b></p> <p>Organise students into groups and demonstrate to them how to weld metals in corner joint on vertical position</p> <p><b>Practical work:</b></p> <p>Organise the students in groups and guide them to weld metals in corner joint on</p>	<ul style="list-style-type: none"> <li>Inspect gas welding equipment</li> <li>Assemble gas cylinder</li> <li>Select nozzle sizes</li> <li>Select welding rods</li> <li>Cut plate to specifications</li> <li>Light the torch and Adjust welding flames</li> <li>Align a workpiece in corner joint on</li> </ul>	Workpieces welded in corner joint on vertical position conforms to technical specifications	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should describe how to:</p> <ul style="list-style-type: none"> <li>Weld metals by gas flame</li> <li>Weld metals in corner joint</li> <li>Weld on horizontal position</li> <li>Set welding flame</li> </ul>	<p>The following tools, equipment and safety gears are be available:</p> <ul style="list-style-type: none"> <li>Oxy-acetylene plant</li> <li>Pressure regulator</li> <li>Welding torch.</li> <li>Hose pipes</li> <li>Gas trolley</li> <li>Cylinder key</li> <li>Spark lighter</li> <li>Ball pein hammer</li> <li>Chisel</li> </ul>	

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				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			vertical position	vertical position <ul style="list-style-type: none"> <li>• Weld the joint</li> <li>• Keep on maintaining movement of torch and rod</li> </ul>		<ul style="list-style-type: none"> <li>• Weld metal in corner joint on vertical position</li> </ul> <p><b>Principles:</b> The student should state the principles of:</p> <ul style="list-style-type: none"> <li>• Welding metals by gas flame</li> <li>• Setting welding flame</li> </ul> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Identify parts of gas welding equipment and their functions</li> <li>• Suggest recommended working flames and pressure</li> <li>• Present the side effects of back fire and flash back</li> <li>• Explain different welding procedures and techniques</li> </ul>	<ul style="list-style-type: none"> <li>• Wire brush</li> <li>• Centre punch</li> <li>• Leather gloves</li> <li>• Clear goggles</li> <li>• Angle grinder</li> <li>• Bench vice</li> <li>• Safety boots</li> <li>• Canvas spats</li> <li>• Dust mask</li> <li>• Overalls</li> </ul>	

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				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
						<b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>Safety precautions to be observed while doing the task</li> </ul>		
		(d) Welding metals in lap joint on overhead position	<b>Demonstration :</b>  Organise students in groups and demonstrate to them how to weld metals in lap joint on overhead position  <b>Practical work:</b>  Organise the students in groups and guide them to weld metals in lap joint on overhead position	<ul style="list-style-type: none"> <li>Inspect gas welding equipment.</li> <li>Assemble gas cylinder.</li> <li>Select nozzle sizes.</li> <li>Select welding rods.</li> <li>Cut plate to specifications.</li> <li>Light the torch and Adjust welding flames.</li> <li>Align a workpiece in lap joint on overhead position.</li> <li>Weld the joint.</li> </ul>	Workpieces welded in lap joint on overhead position conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain how to: <ul style="list-style-type: none"> <li>Weld metals by gas flame</li> <li>Weld metals in lap joint</li> <li>weld in overhead position</li> <li>Set welding flame</li> <li>Perform gas welding in overhead position</li> </ul>	The following tools, equipment and safety gears are available: <ul style="list-style-type: none"> <li>Oxy-acetylene plant.</li> <li>Pressure regulator.</li> <li>Welding torch.</li> <li>Hose pipes.</li> <li>Gas trolley.</li> <li>Cylinder key.</li> <li>Spark lighter.</li> <li>Ball pein hammer.</li> <li>Chisel.</li> <li>Wire brush.</li> <li>Centre punch.</li> <li>Leather gloves.</li> <li>Clear goggles.</li> <li>Angle grinder.</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
				<ul style="list-style-type: none"> <li>Keep on maintaining movement of torch and rod</li> </ul>		<p><b>Principles:</b> The student should describe the principles of:</p> <ul style="list-style-type: none"> <li>Welding metals by gas flame</li> <li>Setting welding flame</li> </ul> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>Identify parts of gas welding equipment and their functions</li> <li>Suggest recommended working flames and pressure</li> <li>Describe the side effects of back fire and flash back</li> <li>List down different welding procedures and techniques</li> </ul> <p><b>Circumstantial knowledge:</b></p>	<ul style="list-style-type: none"> <li>Bench vice.</li> <li>Safety boots.</li> <li>Canvas spats.</li> <li>Dust mask.</li> <li>Overalls.</li> </ul>	

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				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
						<b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>Safety precautions to be observed while doing the task.</li> </ul>		
	2.2 Carrying out body panel cutting by flame	(a) Cutting the rusted panel of car body and replacing a new formed section	<b>Brainstorming:</b> Guide the students to explain the concept of gas flame cutting, vehicle body cutting and repair by gas flame  <b>Simulation:</b> Provide students with a number of videos to simulate cutting of rusted vehicle panels, and then how to prepare, replace and weld a new formed section by using flame.  <b>Demonstration</b>	<b>The students should be able to:</b> <ul style="list-style-type: none"> <li>Inspect gas welding equipment.</li> <li>Assemble gas cylinders.</li> <li>Select nozzle sizes.</li> <li>Select cutting torch.</li> <li>Set working pressure.</li> <li>Cut and file plate to specifications</li> <li>Light the torch.</li> <li>Adjust cutting flames.</li> <li>Align and tack cut the workpieces.</li> <li>Keep on</li> </ul>	A rusted body panel cut and replaced with new formed metal section conforms to technical specifications.	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain how to: <ul style="list-style-type: none"> <li>Perform gas cutting by observing procedures.</li> <li>Cut rusted vehicle body panel by gas.</li> <li>Replace with a new formed section</li> </ul> <b>Principles:</b> The student should explain the principles of:	This element can be achieved at a work place, training institution or school workshops and premises.  The following tools, equipment and safety gears are available: <ul style="list-style-type: none"> <li>Oxy-acetylene plant.</li> <li>Pressure regulator.</li> <li>Cutting torch.</li> <li>Hose pipes.</li> <li>Gas trolley.</li> <li>Cylinder key.</li> <li>Spark lighter.</li> <li>Ball pein hammer.</li> <li>Chisel.</li> <li>Wire brush.</li> </ul>	88

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				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			<p>Organise students in groups and demonstrate to them how to cut rusted body and then how to prepare, replace and weld a new formed section by using flame</p> <p><b>Practical work:</b> Organise the students into groups and guide them to perform gas flame cutting on rusted body panel and then welding a new a new formed section (patch)</p>	maintaining movement of torch.		<ul style="list-style-type: none"> <li>• Cutting metal by gas flame.</li> <li>• Obtaining smooth Kerf.</li> <li>• Setting cutting flame.</li> </ul> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Describe parts of gas cutting equipment and their functions.</li> <li>• Suggest recommended working flames and pressure.</li> <li>• Describe the side effects of back fire and flash back.</li> <li>• Outline different cutting procedures and techniques.</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• Safety</li> </ul>	<ul style="list-style-type: none"> <li>• Centre punch.</li> <li>• Leather gloves.</li> <li>• Clear goggles.</li> <li>• Angle grinder.</li> <li>• Bench vice.</li> <li>• Safety boots.</li> <li>• Canvas spats.</li> <li>• Dust mask.</li> </ul> <p>Overalls.</p>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
						precautions to be observed while doing metal cutting		
		(b) Cutting the collided panel of car body and replacing a new formed section	<p><b>Simulation:</b> Provide students with a number of videos to simulate cutting of collide vehicle panels using flame.</p> <p><b>Demonstration :</b> Organise students in groups and demonstrate to them how to cut collided body and panel</p> <p><b>Practical work:</b> Organise the students into manageable groups and guide them to perform gas cutting on</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>Inspect gas welding equipment.</li> <li>Assemble gas cylinders.</li> <li>Select nozzle sizes.</li> <li>Select cutting torch.</li> <li>Set working pressure.</li> <li>Cut and file plate to specifications.</li> <li>Light the torch.</li> <li>Adjust cutting flames.</li> <li>Align and tack cut the workpieces.</li> <li>Keep on maintaining movement of torch.</li> </ul>	A collided vehicle body panel cut and replaced with new formed metal section conforms to technical specifications.	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should explain how to:</p> <ul style="list-style-type: none"> <li>Perform gas cutting by observing procedures.</li> <li>Cut collided vehicle body panel by gas.</li> <li>Replace with a new formed section</li> </ul> <p><b>Principles:</b> The student should state the principles of:</p> <ul style="list-style-type: none"> <li>Cutting metal by gas flame.</li> <li>Obtaining</li> </ul>	<p>This element can be achieved at a work place, training institution or school workshops and premises.</p> <p>The following tools, equipment and safety gears are be available:</p> <ul style="list-style-type: none"> <li>Oxy-acetylene plant.</li> <li>Pressure regulator.</li> <li>Cutting torch.</li> <li>Hose pipes.</li> <li>Gas trolley.</li> <li>Cylinder key.</li> <li>Spark lighter.</li> <li>Ball pein hammer.</li> <li>Chisel.</li> <li>Wire brush.</li> <li>Centre punch.</li> <li>Leather gloves.</li> <li>Clear goggles.</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			collided body panel and welding a new a new formed section (patch)			<p>smooth Kerf.</p> <ul style="list-style-type: none"> <li>Setting cutting flame.</li> </ul> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>Describe parts of gas cutting equipment and their functions.</li> <li>Suggest recommended working flames and pressure.</li> <li>Describe the side effects of back fire and flash back.</li> <li>Outline different cutting procedures and techniques.</li> </ul> <p><b>Circumstantial knowledge: Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>Safety precautions to be observed while</li> </ul>	<ul style="list-style-type: none"> <li>Angle grinder.</li> <li>Bench vice.</li> <li>Safety boots.</li> <li>Canvas spats.</li> <li>Dust mask.</li> </ul> <p>Overalls.</p>	



Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
						doing metal cutting		
3. Performing arc welding and cutting on vehicle frame	3.1 Carrying out mild steel arc welding	(a) Welding straight beads	<b>Brainstorming:</b> Guide the students to explain the concept of arc welding <b>Simulation:</b> Provide students with a number of videos to simulate various techniques of welding metals in different joints on different positions by arc welding <b>Demonstration :</b> Organise students in groups and demonstrate to them how to weld straight beads in down	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Inspect the machine, cable and electrode holder</li> <li>• Interpret working drawing</li> <li>• Prepare materials for welding.</li> <li>• Select type and size of electrode for the job.</li> <li>• Set recommended current.</li> <li>• Weld a workpiece in down hand straight beads</li> </ul>	Welded straight beads conforms to technical specifications	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The student should explain how to: <ul style="list-style-type: none"> <li>• Perform arc welding</li> <li>• Minimize distortion</li> <li>• Obtain good penetration</li> <li>• Select weld current</li> <li>• Weld straight bead</li> </ul> <b>Principles:</b> The student should explain the principles involved in welding straight beads <b>Theories:</b> The student: <ul style="list-style-type: none"> <li>• Distinguish types</li> </ul>	The following tools, equipment and safety gears are be available: <ul style="list-style-type: none"> <li>• Welding machine</li> <li>• Welding cables</li> <li>• Electrode holder</li> <li>• Welding shield</li> <li>• Chipping hammer</li> <li>• Wire brush</li> <li>• Work bench</li> <li>• Welding tongs</li> <li>• Angle grinder</li> <li>• Flat file</li> <li>• Bench vice</li> <li>• Scriber</li> <li>• Earth clamp</li> <li>• Ball pein hammer</li> <li>• Centre punch</li> <li>• Overalls</li> <li>• Leather gloves</li> <li>• Canvas spats</li> <li>• Safety boots</li> </ul>	180

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			<p>hand position</p> <p><b>Practical work:</b></p> <p>Organise the students into groups and guide them to weld in down hand position</p>			<p>of metals and their properties</p> <ul style="list-style-type: none"> <li>• Explain the types and functions of welding equipment</li> <li>• Describe groove preparations</li> <li>• Uses of wire brush and chipping hammer</li> <li>• Clarify the metallurgical effects on weldment</li> <li>• Explain the Characteristics of AC and DC welding machine.</li> <li>• Distinguish types of welds</li> <li>• Distinguish types of electrode coatings and function</li> <li>• Explain work angle and lead angle</li> <li>• Identify welding symbols</li> <li>• Identify types of</li> </ul>	<ul style="list-style-type: none"> <li>• Leather apron</li> <li>• Electrical power supply</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
						welding beads <ul style="list-style-type: none"> <li>Present the types of distortion</li> <li>Describe joint design</li> </ul> <b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>Safety precautions to be observed while welding the workpiece</li> </ul>		
		(b) Welding metal in down hand butt joint	<b>Demonstration :</b>  Organise students into groups and demonstrate to them how to weld metals in down hand butt joint  <b>Practical work:</b>  Organise the students into	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> <li>Inspect the machine, cable and electrode holder</li> <li>Interpret working drawing</li> <li>Prepare</li> </ul>	Welded metal in down hand butt joint conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain how to weld metal in down hand butt joint  <b>Principles:</b> The student should explain the principles involved in welding	This element can be achieved at a work place, training institution or school workshops and premises.  The following tools, equipment and safety gears are available: <ul style="list-style-type: none"> <li>Welding machine.</li> <li>Welding</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning 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 and guide them to weld metals in down hand butt joint	materials for welding <ul style="list-style-type: none"> <li>• Select type and size of electrode for the job</li> <li>• Set recommended current</li> <li>• Weld a workpiece in down hand butt joint</li> </ul>		metal on down hand butt joint  <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>• Define the concept of welding metal in down-hand butt joint</li> <li>• Distinguish types of metals and their properties</li> <li>• Elaborate types and functions of Welding equipment</li> <li>• Explain the uses of wire brush and chipping hammer</li> <li>• Metallurgical effects on weldment</li> <li>• Elaborate the characteristics of AC and DC welding machine</li> <li>• Distinguish Types of welds</li> <li>• Elaborate types of electrode</li> </ul>	cables. <ul style="list-style-type: none"> <li>• Electrode holder.</li> <li>• Welding shield.</li> <li>• Chipping hammer.</li> <li>• Wire brush.</li> <li>• Work bench.</li> <li>• Welding tongs.</li> <li>• Angle grinder.</li> <li>• Flat file.</li> <li>• Bench vice.</li> <li>• Scriber.</li> <li>• Earth clamp.</li> <li>• Ball pein hammer.</li> <li>• Centre punch.</li> <li>• Overalls.</li> <li>• Leather gloves.</li> <li>• Canvas spats.</li> <li>• Safety boots.</li> <li>• Leather apron.</li> </ul> Electrical 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	Product/ Services Assessment	Knowledge Assessment		
						coatings and function <ul style="list-style-type: none"> <li>• Distinguish between work angle and lead angle</li> <li>• Present welding symbols.</li> <li>• Identify types of welding beads</li> <li>• Explain types of distortion</li> <li>• Describe joint design</li> </ul> <b>Circumstantial knowledge:</b> <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Safety precautions to be observed while welding the workpiece</li> </ul>		
		(c) Welding metal in down hand lap joint	<b>Demonstration :</b> Organise students into groups and demonstrate to	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Inspect the</li> </ul>	Welded metal in down hand lap joint conforms to technical specifications.	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The	This element can be achieved at a work place, training institution or school workshops and premises.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			<p>them how to weld metals in down hand lap joint</p> <p><b>Practical work:</b></p> <p>Organise the students into groups and guide them to weld metals in down hand joint</p>	<p>machine, cable and electrode holder.</p> <ul style="list-style-type: none"> <li>• Interpret working drawing.</li> <li>• Prepare materials for welding.</li> <li>• Select type and size of electrode for the job.</li> <li>• Set recommended current.</li> <li>• Weld workpieces in down hand lap joint.</li> </ul>		<p>student should explain how to weld metal in down hand lap joint</p> <p><b>Principles:</b> The student should state the principles involved in welding metal in down hand lap joint</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Distinguish types of metals and their properties.</li> <li>• Explain types and functions of welding equipment.</li> <li>• Describe roove preparations.</li> <li>• Present the uses of wire brush and chipping hammer.</li> <li>• Clarify the metallurgical effects on weldment.</li> </ul>	<p>The following tools, equipment and safety gears are be available:</p> <ul style="list-style-type: none"> <li>• Welding machine.</li> <li>• Welding cables.</li> <li>• Electrode holder.</li> <li>• Welding shield.</li> <li>• Chipping hammer.</li> <li>• Wire brush.</li> <li>• Work bench.</li> <li>• Welding tongs.</li> <li>• Angle grinder.</li> <li>• Flat file.</li> <li>• Bench vice.</li> <li>• Scriber.</li> <li>• Earth clamp.</li> <li>• Ball pein hammer.</li> <li>• Centre punch.</li> <li>• Overalls.</li> <li>• Leather gloves.</li> <li>• Canvas spats.</li> <li>• Safety boots.</li> <li>• Leather apron.</li> </ul> <p>Electrical power</p>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning 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>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>Safety precautions to be observed while welding the workpiece.</li> </ul>	supply.	
		(d) Welding metal in down hand corner joint	<b>Demonstration :</b>  Organise students into groups and demonstrate to them how to weld metals in down hand corner joint  <b>Practical work:</b>  Organise the students in groups and guide them to weld metals in down hand	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> <li>Inspect the machine, cable and electrode holder.</li> <li>Interpret working drawing.</li> <li>Prepare materials for welding.</li> <li>Select type and size of electrode for</li> </ul>	Welded metal in down hand lap joint conforms to technical specifications.	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain the welding technique used to metal in down hand corner joint.  <b>Principles:</b> The student should explain the principles involved in: <ul style="list-style-type: none"> <li>Arc welding.</li> <li>Minimizing distortion.</li> </ul>	This element can be achieved at a work place, training institution or school workshops and premises.  The following tools, equipment and safety gears are available: <ul style="list-style-type: none"> <li>Welding machine.</li> <li>Welding cables.</li> <li>Electrode holder.</li> <li>Welding shield.</li> <li>Chipping</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			corner joint	<p>the job.</p> <ul style="list-style-type: none"> <li>• Set recommended current.</li> <li>• Weld workpieces in down hand corner joint.</li> </ul>		<ul style="list-style-type: none"> <li>• Obtaining good penetration.</li> <li>• Selecting weld current.</li> <li>• Welding metals in corner joint down hand</li> </ul> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Distinguish types of metals and their properties.</li> <li>• Explain types and functions of welding equipment.</li> <li>• Describe groove preparations.</li> <li>• Explain uses of wire brush and chipping hammer.</li> <li>• Show metallurgical effects on weldment.</li> <li>• Explain the characteristics of AC and DC</li> </ul>	<p>hammer.</p> <ul style="list-style-type: none"> <li>• Wire brush.</li> <li>• Work bench.</li> <li>• Welding tongs.</li> <li>• Angle grinder.</li> <li>• Flat file.</li> <li>• Bench vice.</li> <li>• Scriber.</li> <li>• Earth clamp.</li> <li>• Ball pein hammer.</li> <li>• Centre punch.</li> <li>• Overalls.</li> <li>• Leather gloves.</li> <li>• Canvas spats.</li> <li>• Safety boots.</li> <li>• Leather apron.</li> <li>• Electrical power supply.</li> </ul>	



Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
						welding machine. <ul style="list-style-type: none"> <li>• Distinguish types of welds.</li> <li>• Distinguish types of electrode coatings and functions.</li> <li>• Differentiate between work angle and lead angle.</li> <li>• Present welding symbols.</li> <li>• Elaborate the types of distortion.</li> <li>• Describe joint design.</li> </ul> <b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Safety precautions to be observed while welding the workpiece.</li> <li>• First Aid.</li> </ul>		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
		(e) Welding metal in down hand tee joint	<p><b>Demonstration :</b></p> <p>Organise students in groups and demonstrate to them how to weld metals in down hand corner joint</p> <p><b>Practical work:</b></p> <p>Organise the students into groups and guide them to weld metals in down hand corner joint</p>	<p><b>The students should be able to:</b></p> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Inspect the machine, cable and electrode holder.</li> <li>• Interpret working drawing.</li> <li>• Prepare materials for welding.</li> <li>• Select type and size of electrode for the job.</li> <li>• Set recommended current.</li> <li>• Weld workpieces in down hand tee joint.</li> </ul>	Welded metal in down hand tee joint conforms to technical specifications.	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should elaborate the welding technique used to weld metal in down hand tee joint.</p> <p><b>Principles:</b> The student should outline the principles involved in weld metal in down hand tee joint</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Identify types of metals and their properties.</li> <li>• Outline the types and functions of welding equipment.</li> <li>• Discuss uses of wire brush and chipping hammer.</li> </ul>	<p>This element can be achieved at a work place, training institution or school workshops and premises.</p> <p>The following tools, equipment and safety gears are be available:</p> <ul style="list-style-type: none"> <li>• Welding machine.</li> <li>• Welding cables.</li> <li>• Electrode holder.</li> <li>• Welding shield.</li> <li>• Chipping hammer.</li> <li>• Wire brush.</li> <li>• Work bench.</li> <li>• Welding tongs.</li> <li>• Angle grinder.</li> <li>• Flat file.</li> <li>• Bench vice.</li> <li>• Scriber.</li> <li>• Earth clamp.</li> <li>• Ball pein hammer.</li> <li>• Centre punch.</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
						<ul style="list-style-type: none"> <li>Describe the metallurgical effects on weldment.</li> <li>Explain characteristics of AC and DC welding machine.</li> <li>Mention types of welds.</li> <li>Outline types of electrode coatings and function.</li> <li>Differentiate between work angle and lead angle.</li> <li>Elaborate welding symbols.</li> <li>Clarify types of distortion.</li> <li>Explain joint design.</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge</b></p>	<ul style="list-style-type: none"> <li>Overalls.</li> <li>Leather gloves.</li> <li>Canvas spats.</li> <li>Safety boots.</li> <li>Leather apron.</li> </ul> <p>Electrical power supply.</p>	

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				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
						<b>about:</b> <ul style="list-style-type: none"> <li>Safety precautions to be observed while welding the workpiece.</li> </ul>		
		(f) Welding metal in a horizontal butt joint.	<b>Brainstorming:</b> Guide the students to explain the concept of arc welding on horizontal position  <b>Simulation:</b> Provide students with a number of videos to simulate arc welding in positions  <b>Demonstration :</b> Organise students into groups and demonstrate to them how to	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> <li>Inspect the machine, cable and electrode holder.</li> <li>Interpret working drawing.</li> <li>Prepare materials for welding.</li> <li>Select type and size of electrode for the job.</li> <li>Set recommended current.</li> <li>Weld</li> </ul>	Welded metal in horizontal butt joint conforms to technical specifications.	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should state the welding technique used to weld metal in a horizontal butt joint  <b>Principles:</b> The student should outline the principles involved in weld metal in a horizontal butt joint  <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>Explain types of metals and their properties.</li> <li>Describe the types and</li> </ul>	This element can be achieved at a work place, training institution or school workshops and premises.  The following tools, equipment and safety gears are available: <ul style="list-style-type: none"> <li>Welding machine.</li> <li>Welding cables.</li> <li>Electrode holder.</li> <li>Welding shield.</li> <li>Chipping hammer.</li> <li>Wire brush.</li> <li>Work bench.</li> <li>Welding tongs.</li> <li>Angle grinder.</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			<p>weld metals in down hand butt joint</p> <p><b>Practical work:</b></p> <p>Organise the students into groups and guide them to weld metals in down hand butt joint</p>	workpieces in horizontal butt joint.		<p>functions of welding equipment.</p> <ul style="list-style-type: none"> <li>Describe groove preparations.</li> <li>Explain the uses of wire brush and chipping hammer.</li> <li>Present the metallurgical effects on weldment.</li> <li>Explain the characteristics of AC and DC welding machine.</li> <li>Identify types of welds.</li> <li>Elaborate types of electrode coatings and function.</li> <li>Differentiate between work angle and lead angle.</li> <li>Present welding symbols.</li> <li>Explain types of distortion.</li> </ul>	<ul style="list-style-type: none"> <li>Flat file.</li> <li>Bench vice.</li> <li>Scriber.</li> <li>Earth clamp.</li> <li>Ball pein hammer.</li> <li>Centre punch.</li> <li>Overalls.</li> <li>Leather gloves.</li> <li>Canvas spats.</li> <li>Safety boots.</li> <li>Leather apron.</li> <li>Electrical power supply.</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
						<ul style="list-style-type: none"> <li>Describe joint design.</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>Safety precautions to be observed while welding the workpiece.</li> <li>First Aid.</li> </ul>		
		(g) Welding metal in horizontal Tee joint	<p><b>Demonstration :</b></p> <p>Organise students into groups and demonstrate to them how to weld metals in horizontal Tee joint</p> <p><b>Practical work:</b></p> <p>Organise the students into groups and guide them to</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> <li>Inspect the machine, cable and electrode holder.</li> <li>Interpret working drawing.</li> <li>Prepare materials for welding.</li> </ul>	Welded metal in horizontal tee joint conforms to technical specifications	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should explain the welding technique used</p> <p><b>Principles:</b> The student should outline the principles involved in:</p> <ul style="list-style-type: none"> <li>Arc welding</li> <li>Minimizing</li> </ul>	<p>The following tools, equipment and safety gears are available:</p> <ul style="list-style-type: none"> <li>Welding machine</li> <li>Welding cables</li> <li>Electrode holder</li> <li>Welding shield</li> <li>Chipping hammer</li> <li>Wire brush</li> <li>Work bench</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			weld metals in horizontal Tee joint	<ul style="list-style-type: none"> <li>Select type and size of electrode for the job.</li> <li>Set recommended current.</li> <li>Weld workpieces in horizontal tee joint.</li> </ul>		distortion <ul style="list-style-type: none"> <li>Obtaining good penetration</li> <li>Selecting weld current</li> <li>Welding metals in horizontal Tee joint</li> </ul> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>Explain types of metals and their properties</li> <li>Outline the types and functions of welding equipment</li> <li>Describe groove preparations</li> <li>Explain the uses of wire brush and chipping hammer</li> <li>Elaborate the metallurgical effects on weldment</li> <li>Explain characteristics of AC and DC</li> </ul>	<ul style="list-style-type: none"> <li>Welding tongs</li> <li>Angle grinder</li> <li>Flat file</li> <li>Bench vice</li> <li>Scriber</li> <li>Earth clamp</li> <li>Ball pein hammer</li> <li>Centre punch</li> <li>Overalls</li> <li>Leather gloves</li> <li>Canvas spats</li> <li>Safety boots</li> <li>Leather apron</li> <li>Electrical power supply</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
						welding machine <ul style="list-style-type: none"> <li>Distinguish types of welds</li> <li>Identify types of electrode coatings and function</li> <li>Distinguish between work angle and lead angle</li> <li>Present welding symbols</li> <li>Clarify types of distortion</li> <li>Explain joint design</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>Safety precautions to be observed while welding the workpiece</li> <li>First Aid</li> </ul>		
		(h) Welding metal in	<b>Demonstration :</b>	<b>The student should be able to:</b>	Welded metal in horizontal lap	<b>Knowledge evidence:</b>	The following tools,	



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		horizontal lap joint	<p>Organise students in groups and demonstrate to them how to weld metals in horizontal lap joint</p> <p><b>Practical work:</b></p> <p>Organise the students into groups and guide them to weld metals in horizontal lap joint</p>	<ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Inspect the machine, cable and electrode holder</li> <li>• Interpret working drawing</li> <li>• Prepare materials for welding</li> <li>• Select type and size of electrode for the job</li> <li>• Set recommended current</li> <li>• Weld a workpiece in horizontal lap joint</li> </ul>	joint conforms to technical specifications	<p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should the welding technique used</p> <p><b>Principles:</b> The student should state the principles involved in:</p> <ul style="list-style-type: none"> <li>• Arc welding</li> <li>• Minimizing distortion</li> <li>• Obtaining good penetration</li> <li>• Selecting weld current</li> <li>• Welding metals in horizontal lap joint</li> </ul> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Elaborate the types of metals and their properties</li> <li>• Explain types</li> </ul>	<p>equipment and safety gears are be available:</p> <ul style="list-style-type: none"> <li>• Welding machine</li> <li>• Welding cables</li> <li>• Electrode holder</li> <li>• Welding shield</li> <li>• Chipping hammer</li> <li>• Wire brush</li> <li>• Work bench</li> <li>• Welding tongs</li> <li>• Angle grinder</li> <li>• Flat file</li> <li>• Bench vice</li> <li>• Scriber</li> <li>• Earth clamp</li> <li>• Ball pein hammer</li> <li>• Centre punch</li> <li>• Overalls</li> <li>• Leather gloves</li> <li>• Canvas spats</li> <li>• Safety boots</li> <li>• Leather apron</li> <li>• Electrical power supply</li> </ul>	

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				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
						and functions of welding equipment <ul style="list-style-type: none"> <li>• Explain groove preparations</li> <li>• Describe the uses of wire brush and chipping hammer</li> <li>• Explain metallurgical effects on weldment</li> <li>• Explain characteristics of AC and DC welding machine</li> <li>• Clarify the types of welds</li> <li>• Elaborate types of electrode coatings and functions</li> <li>• Differentiate between work angle and lead angle</li> <li>• Present welding symbols</li> <li>• Explain types of distortion</li> <li>• Describe joint design</li> </ul>		

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				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
						<b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>Safety precautions to be observed while welding the workpiece</li> <li>First Aid</li> </ul>		
		(i) Welding metal in horizontal corner joint	<b>Demonstration :</b>  Organise students in groups and demonstrate to them how to weld metals in horizontal corner joint  <b>Practical work:</b>  Organise the students in groups and guide them to weld metals in horizontal	<b>The students should be able to:</b> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> <li>Inspect the machine, cable and electrode holder</li> <li>Interpret working drawing</li> <li>Prepare materials for welding</li> <li>Select type and size of</li> </ul>	Welded metal in horizontal corner joint conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain the welding technique used  <b>Principles:</b> The student should state the principles involved in: <ul style="list-style-type: none"> <li>Arc welding</li> <li>Minimizing distortion</li> <li>Obtaining good</li> </ul>	The following tools, equipment and safety gears are available: <ul style="list-style-type: none"> <li>Welding machine</li> <li>Welding cables</li> <li>Electrode holder</li> <li>Welding shield</li> <li>Chipping hammer</li> <li>Wire brush</li> <li>Work bench</li> <li>Welding tongs</li> <li>Angle grinder</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			corner joint	electrode for the job <ul style="list-style-type: none"> <li>• Set recommended current</li> <li>• Weld a workpiece in horizontal corner joint</li> </ul>		penetration <ul style="list-style-type: none"> <li>• Selecting weld current</li> <li>• Welding metals in horizontal corner joint</li> </ul> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Discuss the types of metals and their properties</li> <li>• Explain the types and functions of welding equipment</li> <li>• Explain groove preparations</li> <li>• Elaborate the uses of wire brush and chipping hammer</li> <li>• Describe the metallurgical effects on weldment</li> <li>• Explain the characteristics of AC and DC welding machine</li> </ul>	<ul style="list-style-type: none"> <li>• Flat file</li> <li>• Bench vice</li> <li>• Scriber</li> <li>• Earth clamp</li> <li>• Ball peen hammer</li> <li>• Centre punch</li> <li>• Overalls</li> <li>• Leather gloves</li> <li>• Canvas spats</li> <li>• Safety boots</li> <li>• Leather apron</li> <li>• Electrical power supply</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
						<ul style="list-style-type: none"> <li>• Elaborate the types of welds</li> <li>• Discuss the types of electrode coatings and functions</li> <li>• Differentiate work angle from lead angle</li> <li>• Identify welding symbols</li> <li>• Explain types of distortion</li> <li>• Describe joint design</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• Safety precautions to be observed while welding the workpiece</li> </ul>		
	3.2 Carrying out mild steel arc cutting	(a) Performing arc cutting on dented frame	<b>Brainstorming:</b>  Guide the students to explain the	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Inspect the</li> </ul>	A dented vehicle frame cut conforms to technical	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge</b></p>	The following tools, equipment and safety gears are be	140

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				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			<p>concept of arc cutting</p> <p><b>Simulation:</b></p> <p>Provide students with a number of videos to simulate various techniques of arc cutting on dented vehicle frame</p> <p><b>Demonstration :</b></p> <p>Organise students in groups and demonstrate to them how to cut dented vehicle frame by arc cutting</p> <p><b>Practical work:</b></p> <p>Organise the students in groups and guide them to cut dented frame by arc</p>	<p>machine, cable and electrode holder</p> <ul style="list-style-type: none"> <li>• Interpret working drawing</li> <li>• Set recommended current</li> <li>• Cut a workpiece with electrode</li> <li>• Control electrode travel speed along the cut</li> <li>• Clean the oxides along the kerfs</li> <li>• Clean the equipment,</li> </ul>	specifications	<p><b>of:</b></p> <p><b>Methods used:</b> The student should elaborate different ways of cutting thick metals</p> <p><b>Principles:</b> The student should outline the principles involved in:</p> <ul style="list-style-type: none"> <li>• Cutting by arc</li> <li>• Taking measurements</li> </ul> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Describe parts and functions of cutting equipment</li> <li>• Elaborate metallurgical effect during cutting</li> <li>• Explain the science supporting the cutting process</li> </ul>	<p>available:</p> <ul style="list-style-type: none"> <li>• Welding machine</li> <li>• Welding cables</li> <li>• Electrode holder</li> <li>• Welding shield</li> <li>• Chipping hammer</li> <li>• Wire brush</li> <li>• Work bench</li> <li>• Welding tongs</li> <li>• Angle grinder</li> <li>• Flat file</li> <li>• Bench vice</li> <li>• Scriber</li> <li>• Earth clamp</li> <li>• Ball peen hammer</li> <li>• Centre punch</li> <li>• Overalls</li> <li>• Leather gloves</li> <li>• Canvas spats</li> <li>• Safety boots</li> <li>• Leather apron</li> <li>• Electrical power supply</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning 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			<ul style="list-style-type: none"> <li>Derive the formula for current selections</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>Safety precautions to be observed while cutting a workpiece by arc</li> </ul>		
		(b) Performing arc gouging	<p><b>Brainstorming:</b></p> <p>Guide the students to explain the concept of arc gouging</p> <p><b>Simulation:</b></p> <p>Provide students with a number of videos to simulate various techniques of arc gouging on dented vehicle</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>Inspect the machine, cable and electrode holder</li> <li>Interpret working drawing</li> <li>Set recommended air flow pressure</li> </ul>	Arc gouging cut conforms to technical specifications	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should explain different ways of cutting thick metals</p> <p><b>Principles:</b> The student should state the principles involved in:</p>	<p>The following tools, equipment and safety gears are available:</p> <ul style="list-style-type: none"> <li>Welding machine</li> <li>Welding cables</li> <li>Electrode holder</li> <li>Welding shield</li> <li>Chipping hammer</li> <li>Wire brush</li> </ul>	

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				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			<p>frame</p> <p><b>Demonstration :</b></p> <p>Organise students in groups and demonstrate to them how to perform arc gouging on dented vehicle frame</p> <p><b>Practical work:</b></p> <p>Organise the students into groups and guide them to perform arc gouging on dented frame</p>	<ul style="list-style-type: none"> <li>• Cut a workpiece with electrode</li> <li>• Control electrode travel speed along the cut</li> <li>• Clean the oxides along the kerfs</li> </ul>		<ul style="list-style-type: none"> <li>• Arc gouge cutting</li> <li>• Taking measurements</li> </ul> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Identify parts and equipment used in arc gouging</li> <li>• Describe the metallurgical effects during cutting</li> <li>• Explain the science supporting the cutting process</li> <li>• State the formula for current selections</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• Safety</li> </ul>	<ul style="list-style-type: none"> <li>• Work bench</li> <li>• Air compressor</li> <li>• Welding tongs</li> <li>• Angle grinder</li> <li>• Flat file</li> <li>• Bench vice</li> <li>• Scriber</li> <li>• Earth clamp</li> <li>• Ball pein hammer</li> <li>• Centre punch</li> <li>• Overalls</li> <li>• Leather gloves</li> <li>• Canvas spats</li> <li>• Safety boots</li> <li>• Leather apron</li> <li>• Electrical power supply</li> </ul>	



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				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
						precautions to be observed while cutting a workpiece by arc		
4 Performing straightening of vehicle body panel	4.1 Carrying out straightening of vehicle bent body panel	(a) Dismantling the damaged panel from the body structure (shell)	<b>Brainstorming:</b> Guide the students to explain the concept of bent body panel straightening  <b>Discussion:</b> Guide students to formulate groups and moderate them to discuss on causes and how to repair bent vehicle body panels  <b>Simulation:</b> Provide students with a number of videos to simulate various techniques of straightening	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>Select tools and equipment for the task</li> <li>Arrange the work place</li> <li>Set and adjust the equipment</li> <li>Beat the bent surface</li> <li>Observe safety</li> <li>Clean the working area</li> <li>Store tools and equipment into proper custody</li> </ul>	Dismantled vehicle body panel conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain how to dismantle the damaged body panel properly  <b>Principles:</b> The student should explain the principles involved in dismantling the damaged body panel  <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>Describe properties of dented surface</li> <li>Explain different types of damages</li> <li>Classify different</li> </ul>	The following tools, equipment and safety gears are available: <ul style="list-style-type: none"> <li>Auto-body panel beating kit</li> <li>Hand operated body jack</li> <li>Hydraulic body jack</li> <li>Beating file</li> <li>Overalls</li> <li>Leather gloves</li> <li>Soft hammer</li> <li>Ball peen hammer</li> <li>Set spanners</li> <li>Oxy-acetylene welding plant</li> <li>Body spoons</li> <li>Snips</li> <li>Industrial boots</li> </ul>	90

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			bent vehicle panels  <b>Demonstration :</b>  Organise the students into groups and demonstrate to them how to dismantle the bent vehicle panel from the structure  <b>Practical work:</b>  Organise the students into groups and guide them to dismantle a bent door panel from the vehicle shell			types of tools and equipment used in dismantling body panels (surfaces)  <b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>Safety precautions observed while dismantling body panel</li> <li>Observe safety rules</li> </ul>		
		(b) Straightening by harmonising method	<b>Brainstorming:</b>  Guide the students to explain the concept of harmonizing in straightening	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>Select tools and equipment</li> <li>Perform straightening</li> </ul>	Straighten vehicle body panel by harmonizing conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain how to	The following tools, equipment and safety gears are available: <ul style="list-style-type: none"> <li>Auto-body panel beating</li> </ul>	

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				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			bent body panel  <b>Simulation:</b>  Provide students with a number of videos to simulate various techniques of straightening bent vehicle panels by harmonizing method  <b>Demonstration :</b>  Organise students in groups and demonstrate to them how to straighten the bent vehicle panel by harmonizing method  <b>Practical work:</b>  Organise the students in groups and	by different methods <ul style="list-style-type: none"> <li>• Set and adjust the equipment</li> <li>• Beat the bent surface</li> <li>• Sand the surface</li> <li>• Observe safety</li> <li>• Clean the working area</li> </ul> Store tools and equipment into proper custody		straighten the damaged body panel by harmonizing method  <b>Principles:</b> The student should outline the principles involved in straighten the damaged body panel by harmonizing method  <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>• Describe properties of dented surface</li> <li>• Clarify different types of damages</li> <li>• Classify different types of tools and equipment used in straighten body panels (surfaces)</li> </ul> <b>Circumstantial knowledge:</b>  <b>Detailed knowledge</b>	kit <ul style="list-style-type: none"> <li>• Hand operated body jack</li> <li>• Hydraulic body jack</li> <li>• Beating file</li> <li>• Overalls</li> <li>• Leather gloves</li> <li>• Soft hammer</li> <li>• Ball pein hammer</li> <li>• Set spanners</li> <li>• Oxy-acetylene welding plant</li> <li>• Body spoons</li> <li>• Snips</li> <li>• Hand dollies</li> <li>• Industrial boots</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			guide them to straighten a bent bonnet panel by harmonising method			<b>about:</b> <ul style="list-style-type: none"> <li>Safety precautions observed while straightening body panel</li> <li>Observe safety rules</li> </ul>		
		(c) Re-fixing the panel and parts to the body shell	<b>Brainstorming:</b> Guide the students to explain the concept of re-fixing a body panel on vehicle shell  <b>Demonstration :</b> Organise students into groups and demonstrate to them how to re-fix the vehicle panel structure  <b>Practical work:</b> Organise the students in	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>Select tools and equipment</li> <li>Set gap and align panels</li> <li>Beat the bent surface</li> <li>Sand the surface</li> <li>Observe safety</li> <li>Clean the working area</li> <li>Store tools and equipment into proper custody</li> </ul>	Re-fixed the panel and parts on vehicle body conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain how to re-fix dismantled body panel  <b>Principles:</b> The student should state the principles involved in re-fixing body panel  <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>Describe properties of dented surface</li> <li>Elaborate</li> </ul>	The following tools, equipment and safety gears are available: <ul style="list-style-type: none"> <li>Auto-body panel beating kit</li> <li>Hand operated body jack</li> <li>Hydraulic body jack</li> <li>Beating file</li> <li>Overalls</li> <li>Leather gloves</li> <li>Soft hammer</li> <li>Ball pein hammer</li> <li>Set spanners</li> <li>Oxy-acetylene welding plant</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning 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 and guide them to re-fix a door panel to vehicle shell			different types of damages <ul style="list-style-type: none"> <li>Classify different types of tools and equipment used in re-fixing body panels (surfaces)</li> </ul> <b>Circumstantial knowledge:</b> <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>Safety precautions observed while re-fixing body panel</li> <li>Observe safety rules</li> </ul>	<ul style="list-style-type: none"> <li>Body spoons</li> <li>Snips</li> <li>Hand dollies</li> <li>Industrial boots</li> </ul>	
		(d) Reducing the stretched vehicle metal panel by hot and cold shrinking	<b>Brainstorming:</b> Guide the students to explain the concept of reducing body panel stretches by cold and hot shrinking	<b>The students should be able to:</b> <ul style="list-style-type: none"> <li>Select tools and equipment</li> <li>Inspect gas welding equipment</li> </ul>	Reduced stretches on the vehicle body conforms to technical specifications	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The student should explain how to reduce stretches by cold and hot	The following tools, equipment and safety gears are available: <ul style="list-style-type: none"> <li>Vehicle body/panel</li> <li>Auto-body</li> </ul>	

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			<p><b>Discussion:</b></p> <p>Guide students to formulate groups and moderate them to discuss cold and hot shrinking</p> <p><b>Simulation:</b></p> <p>Provide students with a number of videos to simulate procedures used in straightening bent vehicle panels by cold and hot shrinking</p> <p><b>Demonstration :</b></p> <p>Organise students in groups and demonstrate to them how to straighten the bent vehicle panel by cold</p>	<ul style="list-style-type: none"> <li>Assemble gas cylinders</li> <li>Select nozzle sizes</li> <li>Light the torch</li> <li>Adjust cutting flames</li> <li>Heat the high spot of the panel</li> <li>Beat the bent surface</li> <li>Sand the surface</li> <li>Observe safety</li> <li>Clean the working area</li> <li>Store tools and equipment into proper custody</li> </ul>		<p>shrinking</p> <p><b>Principles:</b> The student should state the principles used in reducing stretches by cold and hot shrinking</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>Describe properties of stretched surface</li> <li>Differentiate between cold and hot shrinking</li> <li>Elaborate types of stretches</li> <li>Classify different types of tools and equipment used for cold and hot shrinking</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>Safety</li> </ul>	<p>panel beating kit</p> <ul style="list-style-type: none"> <li>Hand operated body jack</li> <li>Hydraulic body jack</li> <li>Beating file</li> <li>Overalls</li> <li>Leather gloves</li> <li>Soft hammer</li> <li>Ball pein hammer</li> <li>Set spanners</li> <li>Oxy-acetylene welding plant</li> <li>Body spoons</li> <li>Snips</li> <li>Hand dollies</li> <li>Industrial boots</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			and hot shrinking  <b>Practical work:</b>  Organise the students in groups and guide them to perform cold or hot shrinking			precautions observed while re-fixing body panel <ul style="list-style-type: none"> <li>Observe safety rules</li> </ul>		
	4.2 Carrying out spray painting on repaired body panel	(a) Filling the body filler to the repaired body panel	<b>Brainstorming:</b>  Guide the students to explain the concept of spray painting on vehicle body panel  <b>Simulation:</b>  Provide students with a number of videos to simulate painting on vehicle body panel  <b>Demonstration :</b>	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>Select equipment and tools suitable to perform the task</li> <li>Arrange the work place</li> <li>Set and adjust the body panels</li> <li>Check the body surface</li> <li>Remove low or high spots from the panel surface</li> </ul>	The filled body filler conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The students should explain how to fill body filler on the body panel  <b>Principles:</b> The student should state the principles used in applying body fillers on body panel  <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>Describe properties of</li> </ul>	The following tools, equipment and safety gears are be available: <ul style="list-style-type: none"> <li>Auto-body panel beating kit</li> <li>Beating file</li> <li>Dollies block</li> <li>Pick harmer</li> <li>Rubber squeezer</li> <li>Clean glass</li> <li>Scraper</li> <li>Abrasive materials</li> <li>Sanding disc machine</li> </ul>	65

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			Organise students into groups and demonstrate to them how to fill the body filler to the repaired body panel  <b>Practical work:</b>  Organise the students into groups and guide them to fill the body filler to the repaired body panel	<ul style="list-style-type: none"> <li>• Apply plastic filler</li> <li>• Sand the surface</li> <li>• Observe safety</li> <li>• Clean the working area</li> <li>• Store tools and equipment into proper custody</li> </ul>		body fillers <ul style="list-style-type: none"> <li>• Identify types of body fillers</li> <li>• Explain types of tools and equipment used to fill body filler</li> </ul> <b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Safety precautions observed while re-fixing body panel</li> <li>• Observe safety rules</li> <li>• Waste disposal</li> </ul>	<ul style="list-style-type: none"> <li>• Overalls</li> <li>• Leather gloves</li> <li>• Soft hammer</li> <li>• Ball peen hammer</li> <li>• Industrial boots</li> </ul>	
		(b) Applying undercoat solid paint	<b>Demonstration :</b>  Organise students in groups and demonstrate to them how to apply undercoat solid paint on the repaired	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Select equipment and tools needed for spray painting</li> <li>• Arrange the</li> </ul>	The applied undercoat solid paint conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student applies undercoat solid paint  <b>Principles:</b> The	The following tools, equipment and safety gears are available: <ul style="list-style-type: none"> <li>• Auto-body panel beating kit</li> <li>• Rubber</li> </ul>	



Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
			body panel  <b>Practical work:</b>  Organise the students in groups and guide them to apply undercoat solid paint on the repaired body panel	work place <ul style="list-style-type: none"> <li>• Prepare the body surface and clean well from dust and oil</li> <li>• Apply the undercoat paint</li> <li>• Observe safety</li> <li>• Clean the working area</li> <li>• Store tools and equipment into proper custody</li> </ul>		student should state the principles used in applying undercoat solid paint  <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>• Describe properties of undercoat paints</li> <li>• Explain the different types of undercoat solid paints</li> <li>• Classify the types of tools and equipment used in applying undercoat solid paint</li> </ul> <b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Safety precautions observed while re-fixing body panel</li> <li>• Observe safety</li> </ul>	squeezer <ul style="list-style-type: none"> <li>• Clean glass</li> <li>• Scraper</li> <li>• Abrasive materials</li> <li>• Sanding machine</li> <li>• Overalls</li> <li>• Leather gloves</li> <li>• Air compressor</li> <li>• Spray gun</li> <li>• Helmet</li> <li>• Masks</li> <li>• Rubber gloves</li> <li>• Industrial boots</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per unit
				Process Assessment	Product/ Services Assessment	Knowledge Assessment		
						rules <ul style="list-style-type: none"> <li>• Health issues to consider</li> <li>• Waste disposal</li> </ul>		

### 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	Assessment		
1.0 Performing advanced gas welding on vehicle body panels	1.1 Carrying out welding on ferrous metals body panels	(a) Performing welding metal joints in vertically	<b>Brainstorming:</b>  Guide the students to explain the concept of performing advance gas welding on vehicle body  <b>Simulation:</b>	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Weld the joint</li> <li>• Maintain movement of torch and rod</li> <li>• Maintain angle of torch and filler rod</li> <li>• Check fusion on metals</li> </ul>	Welded metal conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain different welding techniques  <b>Principles:</b> The student should state the principles of Performing welding metal joints	The following tools, equipment and safety gears are be available: <ul style="list-style-type: none"> <li>• Oxy-acetylene plant</li> <li>• Pressure regulator</li> <li>• Welding torch</li> <li>• Hose pipe</li> <li>• Gas trolley</li> </ul>	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	Assessment		
			<p>Provide students with a number of videos to simulate various techniques of advanced gas welding different joints on different positions</p> <p><b>Demonstration:</b></p> <p>Organise students into groups and demonstrate to them how to weld metals in vertical position</p> <p><b>Practical work:</b></p> <p>Organise the students into groups and guide them to weld metals in different joints in vertical position</p>	<ul style="list-style-type: none"> <li>• Maintain orderliness of weld ripples</li> <li>• Check root penetration</li> <li>• Inspect quality of welded joint</li> <li>• Observe safety</li> <li>• Clean workshop and work place</li> <li>• Clean and store equipment and tools</li> </ul>		<p>vertically</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Elaborate main parts of gas welding equipment and their functions</li> <li>• Explain the effects of backfire and flashback</li> <li>• Identify the equipment for welding metals by gas flame</li> <li>• Outline the functions of low- and high-pressure gas generating</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• Safety precautions to be observed</li> </ul>	<ul style="list-style-type: none"> <li>• Cylinder key</li> <li>• Spark lighter</li> <li>• Welding tongs</li> <li>• Ball pein hammer</li> <li>• Work bench</li> <li>• Chisel</li> <li>• Wire brush</li> <li>• Centre punch</li> <li>• Leather apron</li> <li>• Clear goggles</li> <li>• Leather gloves</li> <li>• Industrial boots</li> <li>• Canvas spats</li> <li>• Overalls</li> <li>• Leather Apron</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
						when performing gas cutting <ul style="list-style-type: none"> <li>First Aid</li> </ul>		
		(b) Welding metal joints horizontally	<p><b>Simulation:</b></p> <p>Provide students with a number of videos to simulate various techniques of advanced gas welding in horizontal positions</p> <p><b>Demonstration:</b></p> <p>Organise students in groups and demonstrate to them how to weld metals in horizontal position</p> <p><b>Practical work:</b></p> <p>Organise the students into groups and guide</p>	<ul style="list-style-type: none"> <li>Weld the joint</li> <li>Maintain movement of torch and rod</li> <li>Maintain angle of torch and filler rod</li> <li>Check fusion on metals</li> <li>Maintain orderliness of weld ripples</li> </ul>	Welded ferrous metal conforms to technical specifications	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should explain different welding techniques</p> <p><b>Principles:</b> The student should outline the principles of welding metal joints horizontally</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>Identify main parts of gas welding equipment and their functions</li> <li>Outline the effects of backfire and flashback</li> <li>Classify the equipment for welding metals by</li> </ul>	<p>The following tools, equipment and safety gears are be available:</p> <ul style="list-style-type: none"> <li>Oxy-acetylene plant</li> <li>Pressure regulator</li> <li>Welding torch</li> <li>Hose pipe</li> <li>Gas trolley</li> <li>Cylinder key</li> <li>Spark lighter</li> <li>Welding tongs</li> <li>Ball pein hammer</li> <li>Work bench</li> <li>Chisel</li> <li>Wire brush</li> <li>Centre punch</li> <li>Leather apron</li> <li>Clear goggles</li> <li>Leather gloves</li> <li>Industrial boots</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
			them to weld metals in different joints in horizontal position	of welded joint <ul style="list-style-type: none"> <li>• Observe safety</li> <li>• Clean workshop and work place</li> <li>• Clean and store equipment and tools</li> </ul>		gas flame <ul style="list-style-type: none"> <li>• Describe the functions of low- and high-pressure gas generating</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• Safety precautions to be observed when performing gas cutting</li> <li>• First Aid</li> </ul>	<ul style="list-style-type: none"> <li>• Canvas spats</li> <li>• Overalls</li> <li>• Leather Apron</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
	1.2 Carrying out welding on non-ferrous metal body panels	(a) Performing welding metal joints in vertically	<p><b>Brainstorming:</b></p> <p>Guide the students to explain the concept of performing advanced gas welding on non-ferrous vehicle body panel</p> <p><b>Simulation:</b></p> <p>Provide students with a number of videos to simulate various techniques of performing advanced gas</p>	<ul style="list-style-type: none"> <li>• Check fusion of metals</li> <li>• Maintain orderliness of weld ripples</li> <li>• Check root penetration</li> <li>• Inspect root penetration</li> <li>• Inspect quality of welded pieces</li> <li>• Observe safety</li> <li>• Clean workshop and work place</li> </ul> <p>Clean and store equipment and tools after work</p>	Welded non-ferrous metal conforms to technical specifications	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should outline different welding techniques</p> <p><b>Principles:</b> The student should state the principles of welding non-ferrous metals vertically</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Identify main parts of gas welding equipment and their functions</li> </ul>	<p>The following tools, equipment and safety gears are be available:</p> <ul style="list-style-type: none"> <li>• Oxy-acetylene plant</li> <li>• Pressure regulator</li> <li>• Welding torch</li> <li>• Hose pipe</li> <li>• Gas trolley</li> <li>• Cylinder key</li> <li>• Spark lighter</li> <li>• Welding tongs</li> <li>• Ball pein hammer</li> <li>• Work bench</li> <li>• Chisel</li> <li>• Wire brush</li> </ul>	65

Module Title (Main Competence)	Unit 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	Assessment		
			welding on non-ferrous metal different joints on different positions  <b>Demonstration:</b>  Organise students in groups and demonstrate to them how to weld non-ferrous metals in vertical position  <b>Practical work:</b>  Organise the students in groups and guide them to weld non-ferrous metals in different joints in vertical position			<ul style="list-style-type: none"> <li>Describe the effects of backfire and flashback</li> <li>Classify the equipment for welding metals by gas flame</li> <li>Explain the functions of low- and high-pressure gas generating</li> </ul> <b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>Safety precautions to be observed when welding non-ferrous metals vertically</li> <li>First Aid</li> </ul>	<ul style="list-style-type: none"> <li>Centre punch</li> <li>Tinted goggles</li> <li>Leather apron</li> <li>Clear goggles</li> <li>Safety boots</li> <li>Canvas spatters</li> <li>Overalls</li> <li>Leather Apron</li> </ul>	
		(b) Welding metal joints	<b>Demonstration:</b>  Organise the	<ul style="list-style-type: none"> <li>Check fusion of metals</li> <li>Maintain</li> </ul>	Welded non-ferrous metal conforms to	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>	The following tools,	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Assessment		
		horizontally	<p>students in groups and demonstrate to them how to weld non-ferrous metals horizontally</p> <p><b>Practical work:</b></p> <p>Organise the students in groups and guide them to weld non-ferrous metals in different joints horizontally</p>	<p>orderliness of weld ripples</p> <ul style="list-style-type: none"> <li>• Check root penetration</li> <li>• Inspect root penetration</li> <li>• Inspect quality of welded pieces</li> <li>• Observe safety</li> <li>• Clean workshop and work place</li> <li>• Clean and store equipment and tools after work</li> </ul>	technical specifications	<p><b>Methods used:</b> The student should explain different welding techniques</p> <p><b>Principles:</b> The student should elaborate the principles of welding non-ferrous metals horizontally</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Describe the main parts of gas welding equipment and their functions</li> <li>• Elaborate the effects of backfire and flashback</li> <li>• Classify the equipment for welding metals by gas flame</li> <li>• Explain the functions of low- and high-pressure gas generating</li> </ul>	<p>equipment and safety gears are be available:</p> <ul style="list-style-type: none"> <li>• Oxy-acetylene plant</li> <li>• Pressure regulator</li> <li>• Welding torch</li> <li>• Hose pipe</li> <li>• Gas trolley</li> <li>• Cylinder key</li> <li>• Spark lighter</li> <li>• Welding tongs</li> <li>• Ball pein hammer</li> <li>• Work bench</li> <li>• Chisel</li> <li>• Wire brush</li> <li>• Centre punch</li> <li>• Tinted goggles</li> <li>• Leather apron</li> <li>• Clear goggles</li> <li>• Safety boots</li> <li>• Canvas spatters</li> <li>• Overalls</li> <li>• Leather Apron</li> </ul>	



Module Title (Main Competence)	Unit 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	Assessment		
						<b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>Safety precautions to be observed when welding non-ferrous metals horizontally</li> <li>First Aid</li> </ul>		
	1.3 Carrying out metal brazing and bronze welding of vehicle body panels	(a) Welding panels by brazing	<b>Demonstration:</b>  Show the students on how to identify, select, handle tools, equipment and material and then demonstrate how to weld panels by brazing  <b>Practical work:</b>  Organise the students into	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>Inspect gas welding equipment</li> <li>Assemble gas cylinder</li> <li>Select nozzle sizes</li> <li>Select welding rods (bronze rods)</li> <li>Set working pressure</li> </ul>	Ferrous metal bronze welded as per technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain: <ul style="list-style-type: none"> <li>Brazing techniques used</li> <li>Procedures of preventing distortion</li> </ul> <b>Principles:</b> The student should explain the	The following tools, equipment and safety gears are be available: <ul style="list-style-type: none"> <li>Oxy-acetylene plant</li> <li>Pressure regulator</li> <li>Welding torch</li> <li>Hose pipe</li> <li>Truck (trolley)</li> <li>Cylinder key</li> <li>Blow pipe</li> </ul>	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	Assessment		
			manageable groups and guide them to perform metal brazing	<ul style="list-style-type: none"> <li>• Cut and prepare metal surface</li> <li>• Light the torch</li> <li>• Adjust welding flames</li> <li>• Align and tack workpieces</li> <li>• Braze weld joint</li> <li>• Maintain movement of torch and bronze welding rod</li> <li>• Maintain angle of torch and bronze rod</li> <li>• Ensure non fusion on metals</li> <li>• Maintain orderliness of bronze weld ripples</li> <li>• Check root penetration</li> </ul>		<p>principles of:</p> <ul style="list-style-type: none"> <li>• Obtaining good fusion on metals</li> <li>• Obtaining root penetration</li> <li>• Blow pipe</li> <li>• Setting gas pressure</li> </ul> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Describe metal properties</li> <li>• Reveal bronze weld defects</li> <li>• Describe metallurgical effects on weldment</li> <li>• Describe different sizes of welding nozzle and application</li> <li>• Explain different sizes and types of bronze rods</li> <li>• Elaborate different types of flames and their application</li> </ul>	<p>spanner</p> <ul style="list-style-type: none"> <li>• Spark lighter</li> <li>• Ball pein hammer</li> <li>• Chisel</li> <li>• Wire brush</li> <li>• Centre punch</li> <li>• Tongs</li> <li>• Tinted goggles</li> <li>• Leather apron</li> <li>• Leather gloves</li> <li>• Industrial boots</li> <li>• Canvas spat</li> <li>• Dust mask</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
				<ul style="list-style-type: none"> <li>Inspect quality of bronze weld</li> <li>Observe safety</li> <li>Clean workshop and work place</li> <li>Clean tools and equipment</li> <li>Store tools and equipment safely</li> </ul>		<ul style="list-style-type: none"> <li>Describe back fire flashback effect and prevention</li> </ul> <p><b>Circumstantial knowledge about:</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>Safety precautions to be observed while performing metal brazing</li> <li>First Aid</li> </ul>		
		(b)Filling metal surface by brazing	<p><b>Brainstorming:</b></p> <p>Guide the students to explain the concept of filling surface by brazing</p> <p><b>Demonstration:</b></p> <p>Show the students how to identify, select,</p>	<p><b>The students should be able to:</b></p> <ul style="list-style-type: none"> <li>Inspect gas welding equipment</li> <li>Assemble gas cylinder</li> <li>Select nozzle sizes</li> <li>Select welding rods (bronze rods)</li> </ul>	Metal surfaces filled by bronze conform to technical specifications	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should outline the techniques of filling metal surface by brazing</p> <p><b>Principles:</b> The student should explain the principles of:</p> <ul style="list-style-type: none"> <li>Obtaining good</li> </ul>	<p>The following tools, equipment and safety gears are be available:</p> <ul style="list-style-type: none"> <li>Oxy-acetylene plant</li> <li>Pressure regulator</li> <li>Welding torch</li> <li>Hose pipe</li> <li>Truck (trolley)</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
			and handle tools, equipment and materials and then demonstrate how to fill surface by brazing and bronzing  <b>Practical work:</b>  Organise the students into manageable groups and guide them to perform surface filling by brazing and bronzing	<ul style="list-style-type: none"> <li>• Set working pressure</li> <li>• Prepare the metal surface</li> <li>• Light the torch</li> <li>• Adjust welding flames</li> <li>• Align and tack workpieces</li> <li>• Fill grooves or gaps in the metal surface</li> <li>• Maintain the angle of the torch and bronze rod</li> <li>• Ensure no fusion of metals</li> <li>• Check root penetration</li> <li>• Observe safety</li> <li>• Clean workshop and workplace</li> <li>• Clean tools and equipment</li> </ul>		fusion on metals <ul style="list-style-type: none"> <li>• Obtaining root penetration</li> <li>• Blow pipe</li> <li>• Setting gas pressure</li> </ul> <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>• Describe metal properties</li> <li>• Outline bronze weld defects</li> <li>• Explain metallurgical effects on weldment</li> <li>• Explain different sizes of welding nozzle and application</li> <li>• Explain different sizes and types of bronze rods</li> <li>• Classify different types of flames and their application</li> <li>• Describe back fire flashback effect and prevention</li> </ul>	<ul style="list-style-type: none"> <li>• Cylinder key</li> <li>• Blow pipe spanner</li> <li>• Spark lighter</li> <li>• Ball pein hammer</li> <li>• Chisel</li> <li>• Wire brush</li> <li>• Centre punch</li> <li>• Tongs</li> <li>• Tinted goggles</li> <li>• Leather apron</li> <li>• Leather gloves</li> <li>• Industrial boots</li> <li>• Canvas spat</li> <li>• Dust mask</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
				<ul style="list-style-type: none"> <li>Store tools and equipment safely</li> </ul>		<b>Circumstantial knowledge about:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>Safety precautions to be observed when filling metal by brazing</li> <li>First Aid</li> </ul>		
		(c) Welding copper and steel pipes	<b>Brainstorming:</b>  Guide the students to explain procedures for copper and steel pipes by brazing  <b>Demonstration:</b>  Show the students how to identify, select, and handle tools, equipment and materials and	<b>The students should be able to:</b> <ul style="list-style-type: none"> <li>Select and inspect gas welding equipment</li> <li>Assemble gas cylinder</li> <li>Select nozzle sizes</li> <li>Select welding bronze rods</li> <li>Set working pressure</li> <li>Cut and</li> </ul>	Welded copper and steel pipe by brazing conform to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain techniques of welding copper and steel pipe by brazing  <b>Principles:</b> The student should state the principles of: <ul style="list-style-type: none"> <li>Obtaining good fusion on metals</li> <li>Obtaining root</li> </ul>	The following tools, equipment and safety gears are be available: <ul style="list-style-type: none"> <li>Oxy-acetylene plant</li> <li>Pressure regulator</li> <li>Welding torch</li> <li>Hose pipe</li> <li>Truck (trolley)</li> <li>Cylinder key</li> <li>Blow pipe spanner</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
			<p>then demonstrate how to weld copper and steel pipe by brazing and bronzing</p> <p><b>Practical work:</b></p> <p>Organise the students into manageable groups and guide them to Weld copper and steel pipe by brazing</p>	<p>prepare metal surface</p> <ul style="list-style-type: none"> <li>• Light the torch</li> <li>• Adjust welding flames</li> <li>• Align and tack workpieces</li> <li>• Braze weld joint</li> <li>• Maintain movement of torch and bronze rod</li> <li>• Maintain the angle of the torch and bronze rod</li> <li>• Ensure no fusion of metals</li> <li>• Maintain orderliness of bronze weld ripples</li> <li>• Check root penetration</li> <li>• Inspect the</li> </ul>		<p>penetration</p> <ul style="list-style-type: none"> <li>• Blow pipe</li> <li>• Setting gas pressure</li> </ul> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Describe metal properties</li> <li>• Describe bronze weld defects</li> <li>• Explain metallurgical effect on weldment</li> <li>• Describe different sizes of welding nozzle and application</li> <li>• Elaborate different sizes and types of bronze rods</li> <li>• Classify different types of flames and their application</li> <li>• Explain the fire flashback effect and prevention</li> </ul> <p><b>Circumstantial</b></p>	<ul style="list-style-type: none"> <li>• Spark lighter</li> <li>• Ball pein hammer</li> <li>• Chisel</li> <li>• Wire brush</li> <li>• Centre punch</li> <li>• Tongs</li> <li>• Tinted goggles</li> <li>• Leather apron</li> <li>• Leather gloves</li> <li>• Industrial boots</li> <li>• Canvas spat</li> <li>• Dust mask</li> </ul>	

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				Process Assessment	Services Assessment	Assessment		
				quality of the bronze weld <ul style="list-style-type: none"> <li>• Observe safety</li> <li>• Clean workshop and workplace</li> <li>• Clean tools and equipment</li> <li>• Store tools and equipment safely</li> </ul>		<b>knowledge about:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Safety precautions to be observed when copper and steel pipe by brazing</li> </ul>		
2. Performing repair of accident body panel an	2.1 Carrying out dismantling of body parts	(a) Identify the damaged parts	<b>Brainstorming:</b>  Guide the students to explain the procedures to identify the damaged body parts  <b>Simulation:</b>  Provide students with several videos to simulate various techniques on how to identify	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Check damaged parts</li> <li>• Observe safety regulation</li> <li>• Clean the workshop and working area</li> <li>• Store the tools and equipment</li> </ul>	Identifying damaged body parts carried out as per technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain how to identify damaged body parts from the vehicle's body  <b>Principles:</b> The student should explain the principles of: <ul style="list-style-type: none"> <li>• Vehicle body assembly</li> </ul> <b>Theories:</b> The student should:	The following tools, equipment and safety gears are be available: <ul style="list-style-type: none"> <li>• Lay out dismantling plan, or procedures</li> <li>• Spanner kit</li> <li>• Body jack</li> <li>• Overall</li> <li>• Special levers</li> <li>• Hammer</li> <li>• Safety leather gloves</li> <li>• Safety boots</li> </ul>	120

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				Process Assessment	Services Assessment	Assessment		
			<p>damaged vehicle parts</p> <p><b>Demonstration:</b></p> <p>Show the students how to identify, select, and handle tools, equipment and materials and then demonstrate how to identify damaged parts</p> <p><b>Practical work:</b></p> <p>Organise the students into manageable groups and guide them to identify the damaged parts</p>	in safety to its place		<ul style="list-style-type: none"> <li>Describe vehicle body layout</li> <li>Explain uses of different tools</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>Safety precautions when identifying damaged body parts</li> </ul>	<ul style="list-style-type: none"> <li>Chassis welding plant</li> <li>Oxy-acetylene plant</li> </ul>	
		(b) Dismantling	<b>Brainstorming:</b>			<b>Knowledge evidence:</b>		



Module Title (Main Competence)	Unit 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	Assessment		
		body parts	<p>Guide the students to explain the concept of repairing accident body panel</p> <p><b>Discussion:</b></p> <p>Guide the students to formulate groups and moderate them to discuss how to repair accident vehicle body panels</p> <p><b>Simulation:</b></p> <p>Provide students with several videos to simulate various techniques of dismantling vehicle parts vehicle panels</p>	<p><b>The students should be able to:</b></p> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Dismantle the damaged body panels</li> <li>• Fix all parts back to the body shell after repair</li> <li>• Observe safety regulation</li> <li>• Clean the workshop and working area</li> <li>• Store the tools and equipment in safety to its place</li> </ul>	Dismantling process conforms to the technical specifications	<p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should explain how particular body panel can be dismantled from the body</p> <p><b>Principles:</b> The student should state the principles of:</p> <ul style="list-style-type: none"> <li>• Assembling and dismantling a particular body part</li> <li>• Vehicle body layout</li> </ul> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Explain alignment, fitting and tightening</li> <li>• Describe the uses of different tools</li> <li>• Elaborate dismantling procedures</li> </ul> <p><b>Circumstantial knowledge:</b></p>	<p>The following tools, equipment and safety gears are be available:</p> <ul style="list-style-type: none"> <li>• Lay out dismantling plan, or procedures</li> <li>• Spanner kit</li> <li>• Body jack</li> <li>• Overall</li> <li>• Special levers</li> <li>• Hammer</li> <li>• Safety leather gloves</li> <li>• Safety boots</li> <li>• Chassis welding plant</li> <li>• Oxy-acetylene plant</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
			<b>Demonstration:</b> Organise the students into groups and demonstrate to them how to dismantle the vehicle panel from the structure  <b>Practical work:</b> Organise the students into groups and guide them to dismantle vehicle parts from the vehicle shell			<b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Safety precautions when dismantling auto body parts</li> <li>• Environment issues</li> <li>• First Aid</li> </ul>		
	2.2 Carrying out straightening by cold and hot shrinking	(a) Performing straightening	<b>Simulation:</b> Provide the students with a number of videos to simulate various	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Identify the</li> </ul>	The straightened body panel conforms to manufacturers specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain how to straightening	The following tools, equipment and safety gears are be available: <ul style="list-style-type: none"> <li>• Work plan</li> <li>• Shrinking dolly</li> </ul>	125

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Assessment		
			<p>techniques of straightening accident vehicle panels</p> <p><b>Demonstration:</b></p> <p>Organise students in groups and demonstrate to them how to straighten the accident vehicle panel</p> <p><b>Practical work:</b></p> <p>Organise the students in groups and guide them to straighten accident vehicle panels</p>	<p>affected areas</p> <ul style="list-style-type: none"> <li>• Perform straightening by using different methods</li> <li>• Apply heating/welding/cut where need be</li> <li>• Straighten by harmonising method</li> <li>• Observe safety regulations</li> <li>• Clean the working place and tools</li> <li>• Store tools and equipment in safe custody</li> </ul>		<p>body panel</p> <p><b>Principles:</b> The student should outline the principles of body panel straightening</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Explain types and functions of beating tools</li> <li>• Describe properties of materials</li> <li>• Identify straightening effects</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• Safety precautions when straightening body panel</li> <li>• Beating properties</li> <li>• First aid</li> </ul>	<p>blocks</p> <ul style="list-style-type: none"> <li>• Shrinking hammer</li> <li>• Lighter</li> <li>• Welding torch</li> <li>• Beating file</li> <li>• Overall/apron</li> <li>• Safety boots</li> <li>• Safety glasses</li> <li>• Hand tools</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
		(b) Performing cold shrinking	<p><b>Brainstorming:</b></p> <p>Guide the students to explain the concept of cold shrinking in straightening bent body panel</p> <p><b>Simulation:</b></p> <p>Provide the students with a number of videos to simulate various techniques of straightening bent vehicle panels by cold shrinking</p> <p><b>Demonstration:</b></p> <p>Organise the students into groups and demonstrate to them how to</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Identify the affected areas</li> <li>• Locate low or high spot, and strike the panels using beating tools</li> <li>• Observe safety regulations</li> <li>• Clean the working place and tools</li> </ul> <p>Store tools and equipment in safe custody</p>	The straightened body panel by cold shrinking conforms to manufacturers specifications	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should explain how to apply dolly tools and beating file in cold shrinking</p> <p><b>Principles:</b> The student should explain the principles of performing cold shrinking</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Explain types and functions of beating tools</li> <li>• Describe properties of materials</li> <li>• Elaborate beating effects</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p>	<p>The following tools, equipment and safety gears are be available:</p> <ul style="list-style-type: none"> <li>• Work plan</li> <li>• Shrinking dolly blocks</li> <li>• Shrinking hammer</li> <li>• Water dish</li> <li>• Cloth or sponge</li> <li>• Lighter</li> <li>• Welding torch</li> <li>• Beating file</li> <li>• Overall/apron</li> <li>• Safety boots</li> <li>• Safety glasses</li> <li>• Hand tools</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
			straighten the bent vehicle panel by cold shrinking  <b>Practical work:</b>  Organise the students into groups and guide them to straighten a bent bonnet panel by cold shrinking			<ul style="list-style-type: none"> <li>• Safety precautions when panel beating</li> <li>• Beating properties</li> <li>• Environmental requirement</li> <li>• First aid</li> </ul>		
		(c) Performing hot shrinking	<b>Brainstorming:</b>  Guide the students to explain the concept of hot shrinking in straightening bent body panel  <b>Simulation:</b>  Provide the students with a number of videos	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Identify the affected areas</li> <li>• Light the welding torch and set required flame</li> <li>• Locate high spot, heat and</li> </ul>	The straightened body panel by hot shrinking conforms to manufacturers specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain how to: <ul style="list-style-type: none"> <li>• Adjust the flame</li> <li>• Heat the spot</li> <li>• Apply dolly tools and beating file</li> <li>• Apply coolant</li> </ul> <b>Principles:</b> The student should state the	The following tools, equipment and safety gears are be available: <ul style="list-style-type: none"> <li>• Work plan</li> <li>• Oxy-acetylene plant</li> <li>• Shrinking dolly blocks</li> <li>• Shrinking hammer</li> <li>• Water dish</li> <li>• Cloth or sponge</li> </ul>	

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				Process Assessment	Services Assessment	Assessment		
			<p>to simulate various techniques of straightening bent vehicle panels by hot shrinking</p> <p><b>Demonstration:</b></p> <p>Organise students in groups and demonstrate to them how to straighten the bent vehicle panel by hot shrinking</p> <p><b>Practical work:</b></p> <p>Organise the students into groups and guide them to straighten a bent bonnet panel by hot shrinking</p>	<p>strike the panels using beating tools</p> <ul style="list-style-type: none"> <li>• Observe safety regulations</li> <li>• Clean the working place and tools</li> <li>• Store tools and equipment in safe custody</li> </ul>		<p>principles of:</p> <ul style="list-style-type: none"> <li>• Hot shrinking</li> </ul> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Describe types of beating tools</li> <li>• Explain functions of each</li> <li>• Describe properties of materials</li> <li>• Elaborate heating effects</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• Safety precautions when performing hot shrinking</li> <li>• Beating properties</li> <li>• Environmental requirement</li> <li>• First aid</li> </ul>	<ul style="list-style-type: none"> <li>• Lighter</li> <li>• Welding torch</li> <li>• Beating file</li> <li>• Overall/apron</li> <li>• Safety boots</li> <li>• Safety glasses</li> </ul> <p>Hand tools</p>	

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3 Performing resistance welding	3.1 Carrying out resistance welding on sheet metals	(a) Welding sheet metals using resistance welding (spots)	<p><b>Demonstration:</b> Organise the students in groups and demonstrate to them how to perform spot welding</p> <p><b>Practical work:</b> Organise the students into manageable groups and guide them to weld sheet metals using resistance welding (spots)</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>Grind copper electrodes</li> <li>Clean electrode from time to time during process</li> <li>Observe safety regulations</li> <li>Clean work place, tools and equipment</li> <li>Store tools and equipment safely</li> </ul>	The sheet metal welded conforms to technical specifications	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should explain resistance welding technique used</p> <p><b>Principles:</b> The student should outline the principles of:</p> <ul style="list-style-type: none"> <li>Welding sheet metals using resistance welding (spots)</li> <li>Maintaining (cleaning, grinding and aligning) electrodes and workpieces on chucks</li> </ul> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>Describe the main parts of resistance welding equipment and their functions</li> </ul>	<p>The following tools, equipment and safety gears are be available:</p> <ul style="list-style-type: none"> <li>Resistance welding machine</li> <li>Working drawing</li> <li>Measuring tape</li> <li>Tool box</li> <li>Scriber</li> <li>Work bench</li> <li>Wire brush</li> <li>Flat files</li> <li>Clear goggles</li> <li>Leather gloves</li> <li>Tongs</li> <li>Safety boots</li> <li>Electrical power supply</li> <li>Chipping hammer</li> </ul>	60

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				Process Assessment	Services Assessment	Assessment		
						<ul style="list-style-type: none"> <li>Highlight the working principle of resistance welding equipment</li> <li>Explain the metallurgical effects on weldment</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>Safety precautions to be observed while welding</li> <li>First Aid</li> </ul>		
		(b) Welding sheet metal by projection welding	<p><b>Brainstorming:</b></p> <p>Guide the students to explain the concept of welding metals by projection</p> <p><b>Simulation:</b></p> <p>Provide the students with a</p>	<ul style="list-style-type: none"> <li>Set hold time</li> <li>Set off period time</li> <li>Set proper pressure for the job</li> <li>Clean electrode from time to time during process</li> <li>Observe safety</li> </ul>	Welded metal by projection welding conforms to technical specifications	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Method used:</b> The student should explain resistance welding technique used</p> <p><b>Principles:</b> The student should state the principles of:</p>	<p>The following tools, equipment and safety gears are be available:</p> <ul style="list-style-type: none"> <li>Resistance welding machine</li> <li>Working drawing</li> <li>Measuring tape</li> <li>Tool box</li> <li>Scriber</li> </ul>	



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			<p>number of videos to simulate various techniques of welding metals by projections</p> <p><b>Demonstration:</b></p> <p>Organise the students in groups and demonstrate to them how to weld metals by projections</p> <p><b>Practical work:</b></p> <p>Organise the students into groups and guide them to weld metals by projection</p>	<p>regulations</p> <ul style="list-style-type: none"> <li>• Clean work place, tools and equipment</li> <li>• Store tools and equipment safely</li> </ul>		<ul style="list-style-type: none"> <li>• Projection welding</li> <li>• Maintaining (cleaning, grinding and aligning) electrodes and workpieces on chucks</li> </ul> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Describe the main parts of resistance welding equipment and their functions</li> <li>• Explain the working principle of resistance welding equipment</li> <li>• Outline metallurgical effects on weldment</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• Safety precautions when performing</li> </ul>	<ul style="list-style-type: none"> <li>• Work bench</li> <li>• Wire brush</li> <li>• Flat files</li> <li>• Clear goggles</li> <li>• Leather gloves</li> <li>• Tongs</li> <li>• Safety boots</li> <li>• Electrical power supply</li> <li>• Chipping hammer</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
						projection welding • First Aid		
		(c) Welding sheet metal by high-frequency resistance welding	<b>Brainstorming:</b> Guide the students to explain the concept of high-resistance welding <b>Simulation:</b> Provide the students with a number of videos to simulate various techniques of performing high resistance welding <b>Demonstration:</b> Organise students into groups and demonstrate to them how to perform high	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Set hold time</li> <li>• Set off period time</li> <li>• Set proper pressure for the job</li> <li>• Clean electrode from time to time during process</li> <li>• Observe safety regulations</li> <li>• Clean work place, tools and equipment</li> <li>• Store tools and equipment safely</li> </ul>	Welded metal by high-frequency resistance welding conforms to technical specifications	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The student should explain resistance welding technique used <b>Principles:</b> The student should outline the principles of: <ul style="list-style-type: none"> <li>• High-frequency resistance welding</li> <li>• Maintaining (cleaning, grinding and aligning) electrodes and workpieces on chucks</li> </ul> <b>Theories:</b> The student should : <ul style="list-style-type: none"> <li>• Describe the main parts of resistance welding equipment and their functions</li> </ul>	The following tools, equipment and safety gears are be available: <ul style="list-style-type: none"> <li>• Resistance welding machine</li> <li>• Working drawing</li> <li>• Measuring tape</li> <li>• Tool box</li> <li>• Scriber</li> <li>• Work bench</li> <li>• Wire brush</li> <li>• Flat files</li> <li>• Clear goggles</li> <li>• Leather gloves</li> <li>• Tongs</li> <li>• Safety boots</li> <li>• Electrical power supply</li> <li>• Chipping hammer</li> </ul>	

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				Process Assessment	Services Assessment	Assessment		
			resistance welding  <b>Practical work:</b>  Organise the students into groups and guide them to perform high resistance welding			<ul style="list-style-type: none"> <li>Explain the working principle of resistance welding equipment</li> <li>Highlight metallurgical effects on weldment</li> </ul> <b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>Safety precautions when high-frequency resistance welding</li> <li>First Aid</li> </ul>		
	3.2 Carrying out resistance welding on thin metals	(a) Welding thin metals using resistance welding	<b>Demonstration:</b>  Organise students into groups and demonstrate to them how to perform resistance welding on thin metals	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>Set proper pressure for the job</li> <li>Grind copper electrodes</li> <li>Clean electrode from time to time</li> </ul>	The thin welded metal using resistance welding conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain resistance welding technique used  <b>Principles:</b> The student should state the	The following tools, equipment and safety gears are be available: <ul style="list-style-type: none"> <li>Resistance welding machine</li> <li>Working drawing</li> <li>Measuring tape</li> <li>Tool box</li> </ul>	62

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				Process Assessment	Services Assessment	Assessment		
			<b>Practical work:</b>  Organise the students into groups and guide them to perform high-resistance welding on thin metals	during process <ul style="list-style-type: none"> <li>• Observe safety regulation</li> <li>• Clean work place, tools and equipment</li> <li>• Store tools and equipment safely</li> </ul>		principles of: <ul style="list-style-type: none"> <li>• Using resistance welding</li> <li>• Maintaining (cleaning, grinding and aligning) electrodes and workpieces on chucks</li> </ul> <b>Theories:</b> The student should : <ul style="list-style-type: none"> <li>• Describe the main parts of resistance welding equipment and their functions</li> <li>• Explain the working principle of resistance welding equipment</li> <li>• Outline metallurgical effects on weldment</li> </ul> <b>Circumstantial knowledge:</b>  <b>Detailed knowledge</b>	<ul style="list-style-type: none"> <li>• Scriber</li> <li>• Work bench</li> <li>• Wire brush</li> <li>• Flat files</li> <li>• Clear goggles</li> <li>• Leather gloves</li> <li>• Tongs</li> <li>• Safety boots</li> <li>• Electrical power supply</li> <li>• Chipping hammer</li> </ul>	

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				Process Assessment	Services Assessment	Assessment		
						<b>about:</b> <ul style="list-style-type: none"> <li>Safety precautions when performing resistance welding</li> </ul> First Aid		
		(b) Welding thin metal by projection welding	<b>Simulation:</b> Provide the students with several videos to simulate various techniques of welding thin metals by projection welding  <b>Demonstration:</b> Organise students into groups and demonstrate to them how to weld thin metals by projection welding  <b>Practical work:</b>	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> <li>Interpret working drawings</li> <li>Take correct measurements</li> <li>Inspect resistance welding equipment</li> <li>Adjust current in commensurate with metal thickness</li> <li>Place and align a workpiece</li> </ul>	The thin welded metal by projection welding conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain resistance welding technique used  <b>Principles:</b> The student should explain the principles of: <ul style="list-style-type: none"> <li>Thin projection welding</li> <li>Maintaining (cleaning, grinding and aligning) electrodes and workpieces on chucks</li> </ul> <b>Theories:</b> The student should :	The following tools, equipment and safety gears are be available: <ul style="list-style-type: none"> <li>Resistance welding machine</li> <li>Working drawing</li> <li>Measuring tape</li> <li>Tool box</li> <li>Scriber</li> <li>Work bench</li> <li>Wire brush</li> <li>Flat files</li> <li>Clear goggles</li> <li>Leather gloves</li> <li>Tongs</li> <li>Safety boots</li> <li>Electrical power supply</li> <li>Chipping</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
			Organise the students into groups and guide them to weld thin metals by projection	<ul style="list-style-type: none"> <li>• Set squeeze time</li> <li>• Set weld time</li> <li>• Set hold time</li> <li>• Set off period time</li> <li>• Set proper pressure for the job</li> <li>• Grind copper electrodes</li> <li>• Clean electrode from time to time during process</li> <li>• Observe safety regulation</li> <li>• Clean work place, tools and equipment</li> <li>• Store tools and equipment safely</li> </ul>		<ul style="list-style-type: none"> <li>• Describe the main parts of resistance welding equipment and their functions</li> <li>• Explain the working principle of resistance welding equipment</li> <li>• Elaborate metallurgical effects on weldment</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• Safety precautions when performing thin metal projection welding</li> <li>• First Aid</li> </ul>	hammer	
		(c) Welding metal rods a percussion	<b>Simulation:</b> Provide the	<b>The student should be able to:</b>	The welded metal rods using percussion	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b>	The following tools,	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
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		welding machine	<p>students with several videos to simulate various techniques of welding thin metals by percussion welding</p> <p><b>Demonstration:</b></p> <p>Organise the students into groups and demonstrate to them how to weld thin metals by percussion welding</p> <p><b>Practical work:</b></p> <p>Organise the students into groups and guide them to weld thin metals by percussion welding</p>	<ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Interpret working drawings</li> <li>• Take correct measurements</li> <li>• Inspect resistance welding equipment</li> <li>• Perform machine setting</li> <li>• Observe safety regulation</li> <li>• Clean work place, tools and equipment</li> <li>• Store tools and equipment safely</li> </ul>	welding machine conforms to technical specifications	<p><b>Methods used:</b> The student should explain resistance welding technique used</p> <p><b>Principles:</b> The student should examine the principles of:</p> <ul style="list-style-type: none"> <li>• Welding rods by percussion machine</li> <li>• Maintaining (cleaning, grinding and aligning) electrodes and workpieces on chucks</li> </ul> <p><b>Theories:</b> The student should :</p> <ul style="list-style-type: none"> <li>• Describe the main parts of resistance welding equipment and their functions</li> <li>• Explain the working principle of resistance welding equipment</li> <li>• Outline</li> </ul>	<p>equipment and safety gears are be available:</p> <ul style="list-style-type: none"> <li>• Resistance welding machine</li> <li>• Working drawing</li> <li>• Measuring tape</li> <li>• Tool box</li> <li>• Scriber</li> <li>• Work bench</li> <li>• Wire brush</li> <li>• Flat files</li> <li>• Clear goggles</li> <li>• Leather gloves</li> <li>• Tongs</li> <li>• Safety boots</li> <li>• Electrical power supply</li> <li>• Chipping hammer</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
						metallurgical effects on weldment <b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b>  <ul style="list-style-type: none"> <li>Safety precautions when performing metal rods by percussion machine</li> <li>First Aid</li> </ul>		
		(d) Welding thin metal by high-frequency resistance welding	<b>Simulation:</b>  Provide the students with several videos to simulate various techniques of welding thin metals by high resistance welding  <b>Demonstration:</b>  Organise the students into groups and	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> <li>Interpret working drawings</li> <li>Take correct measurements</li> <li>Inspect resistance welding equipment</li> <li>Adjust current</li> </ul>	Welded thin metal by high-frequency resistance welding conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain resistance welding technique used  <b>Principles:</b> The student should state the principles of: <ul style="list-style-type: none"> <li>High-frequency resistance welding</li> <li>Maintaining (cleaning, grinding</li> </ul>	The following tools, equipment and safety gears are be available: <ul style="list-style-type: none"> <li>Resistance welding machine</li> <li>Working drawing</li> <li>Measuring tape</li> <li>Tool box</li> <li>Scriber</li> <li>Work bench</li> <li>Wire brush</li> <li>Flat files</li> <li>Clear goggles</li> </ul>	



Module Title (Main Competence)	Unit 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	Assessment		
			<p>demonstrate to them how to weld thin metals by high-resistance welding</p> <p><b>Practical work:</b></p> <p>Organise the students into groups and guide them to weld thin metals by high resistance welding</p>	<p>in commensurate with metal thickness</p> <ul style="list-style-type: none"> <li>• Place and align a workpiece</li> <li>• Set squeeze time</li> <li>• Set weld time</li> <li>• Set hold time</li> <li>• Set off period time</li> <li>• Set proper pressure for the job</li> <li>• Grind copper electrodes</li> <li>• Clean electrode from time to time during process</li> <li>• Observe safety regulations</li> <li>• Clean work place, tools and equipment</li> <li>• Store tools and</li> </ul>		<p>and aligning) electrodes and workpieces on chucks</p> <p><b>Theories:</b> The student should d:</p> <ul style="list-style-type: none"> <li>• Describe the main parts of resistance welding equipment and their functions</li> <li>• Elaborate the working principle of resistance welding equipment</li> <li>• Outline metallurgical effects on weldment</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• Safety precautions when welding thin metals using high-frequency resistance welding</li> </ul>	<ul style="list-style-type: none"> <li>• Leather gloves</li> <li>• Tongs</li> <li>• Safety boots</li> <li>• Electrical power supply</li> <li>• Chipping hammer</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
				equipment safely		<ul style="list-style-type: none"> <li>First Aid</li> </ul>		
4 Performing straightening of the bent body frame	4.1 Carrying out the dismantling of body attachments	(a) Dismantling the door from the frame and attachments	<p><b>Brainstorming:</b></p> <p>Guide the students to explain the concept of dismantling the exterior attached vehicle part and auxiliaries</p> <p><b>Simulation:</b></p> <p>Provide the students with several videos to simulate various techniques of dismantling the exterior attached vehicle part and auxiliaries</p> <p><b>Demonstration:</b></p> <p>Organise the</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> <li>Locate which part to dismantle</li> <li>Use correct spanners</li> <li>Lift with care</li> <li>Follow the procedure</li> <li>Identify the problem</li> <li>Keep dismantled parts safely</li> <li>Observe safety regulation</li> <li>Clean the working place</li> <li>Store tools and</li> </ul>	The door dismantled from body panels conforms to technical recommendations	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should explain different dismantling procedures</p> <p><b>Principles:</b> The student should explain the principles of dismantling doors and parts</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>Elaborate types of vehicle body shell</li> <li>Describe detachable components of a vehicle</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge</b></p>	<p>The following tools, equipment and safety gears are available:</p> <ul style="list-style-type: none"> <li>Work plan</li> <li>Tool box with spanners</li> <li>Adjustable/pipe wrenches</li> <li>G purpose pliers</li> <li>Hammers</li> <li>Overalls</li> <li>Leather boots</li> <li>Gloves</li> <li>Screw drivers</li> <li>Body jack</li> <li>Tape measure</li> <li>Chisels</li> <li>Oxy-acetylene plant</li> <li>Spark lighter</li> <li>Clear goggles</li> </ul>	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	Assessment		
			<p>students into groups and demonstrate to them how to dismantle the door from the body shell</p> <p><b>Practical work:</b></p> <p>Organise the students into manageable groups and guide them to dismantle doors and attachments</p>	equipment safely		<p><b>about:</b></p> <ul style="list-style-type: none"> <li>• Safety precautions</li> <li>• First aid</li> </ul>		
		(b) Dismantling the interior components	<p><b>Brainstorming:</b></p> <p>Guide the students to explain the concept of dismantling the interior vehicle part and auxiliaries</p>	<p><b>The students should be able to:</b></p> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Locate which part to dismantle</li> <li>• Use correct spanners</li> </ul>	The interior components dismantled from body panels conforms to technical recommendations	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should explain different dismantling procedures</p> <p><b>Principles:</b> The student should state the principles of dismantling</p>	<p>The following tools, equipment and safety gears are be available:</p> <ul style="list-style-type: none"> <li>• Work plan</li> <li>• Tool box with spanners</li> <li>• Adjustable/pipe wrenches</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
			<p><b>Simulation:</b></p> <p>Provide the students with several videos to simulate various techniques of dismantling the interior attached vehicle parts and auxiliaries</p> <p><b>Demonstration:</b></p> <p>Organise the students into groups and demonstrate to them how to dismantle interior parts</p> <p><b>Practical work:</b></p> <p>Organise the students into manageable groups and guide them to dismantled</p>	<ul style="list-style-type: none"> <li>• Lift with care</li> <li>• Follow the procedure</li> <li>• Identify the problem</li> <li>• Keep dismantled parts safely</li> <li>• Observe safety regulation</li> <li>• Clean the working place</li> </ul> <p>Store tools and equipment safely</p>		<p>interior components</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Describe types of vehicle body shell</li> <li>• Explain interior detachable components of a vehicle</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• Safety precautions</li> <li>• First aid</li> </ul>	<ul style="list-style-type: none"> <li>• G purpose pliers</li> <li>• Hammers</li> <li>• Overalls</li> <li>• Leather boots</li> <li>• Gloves</li> <li>• Screw drivers</li> <li>• Body jack</li> <li>• Tape measure</li> <li>• Chisels</li> <li>• Oxy-acetylene plant</li> <li>• Spark lighter</li> <li>• Clear goggles</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
			interior components					
		(c) Performing Glass and window machine removing	<p><b>Demonstration:</b></p> <p>Organise the students into groups and demonstrate to them how to remove glass and window machine</p> <p><b>Practical work:</b></p> <p>Organise the students into manageable groups and guide them to dismantle interior components</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Locate which part to dismantle</li> <li>• Use correct spanners</li> <li>• Lift with care</li> <li>• Follow the procedure</li> <li>• Identify the problem</li> <li>• Keep dismantled parts safely</li> <li>• Observe safety regulation</li> <li>• Clean the working place</li> <li>• Store tools and equipment</li> </ul>	The interior components dismantled from body panels conforms to technical recommendations	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should explain different dismantling procedures</p> <p><b>Principles:</b> The student should state the principles of dismantling interior components</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Describe types of vehicle body shell</li> <li>• Describe types of mechanism used for lifting window glass</li> <li>• Identify interior detachable components of a vehicle</li> </ul> <p><b>Circumstantial</b></p>	<p>The following tools, equipment and safety gears are be available:</p> <ul style="list-style-type: none"> <li>• Work plan</li> <li>• Tool box with spanners</li> <li>• Adjustable/pipe wrenches</li> <li>• G purpose pliers</li> <li>• Hammers</li> <li>• Overalls</li> <li>• Leather boots</li> <li>• Gloves</li> <li>• Screwdrivers</li> <li>• Body jack</li> <li>• Tape measure</li> <li>• Chisels</li> <li>• Oxy-acetylene plant</li> <li>• Spark lighter</li> <li>• Clear goggles</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
				safely		<b>knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>Safety precautions</li> <li>First aid</li> </ul>		
		(d) Removing channels	<b>Simulation:</b>  Provide the students with several videos to simulate various techniques of removing vehicle door channels from the structure  <b>Demonstration:</b>  Organise the students into groups and demonstrate to them how to remove vehicle door channels  <b>Practical work:</b>	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> <li>Locate which part to dismantle</li> <li>Use correct spanners</li> <li>Follow the procedure</li> <li>Identify the problem</li> <li>Keep dismantled parts safely</li> <li>Observe safety regulations</li> <li>Clean the working place</li> </ul>	The vehicle body channel removed /dismantled from body panels conforms to technical recommendations	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain different dismantling procedures  <b>Principles:</b> The student should state the principles of vehicle body channels  <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>Describe the types of vehicle body shell</li> <li>Identify of body channels</li> </ul> <b>Circumstantial</b>	The following tools, equipment and safety gears are be available: <ul style="list-style-type: none"> <li>Work plan</li> <li>Tool box with spanners</li> <li>Adjustable/pipe wrenches</li> <li>G purpose pliers</li> <li>Hammers</li> <li>Overalls</li> <li>Leather boots</li> <li>Gloves</li> <li>Screw drivers</li> <li>Body jack</li> <li>Tape measure</li> <li>Chisels</li> <li>Oxy-acetylene plant</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
			Organise the students into manageable groups and guide them to remove vehicle door channels	Store tools and equipment safely		<b>knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>Safety precautions</li> <li>First aid</li> </ul>	<ul style="list-style-type: none"> <li>Spark lighter</li> <li>Clear goggles</li> </ul>	
		(e) Removing hinges and locks	<b>Simulation:</b>  Provide the students with several videos to simulate various techniques of removing door hinges and locks during door dismantling  <b>Demonstration:</b>  Organise the students into groups and demonstrate to them how to remove door hinges and locks	<b>The students should be able to:</b> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> <li>Locate which part to dismantle</li> <li>Use correct spanners</li> <li>Follow the procedure</li> <li>Identify the problem</li> <li>Keep dismantled parts safely</li> <li>Observe safety regulations</li> </ul>	Hinges and locks removed /dismantled from body panels conforms to technical recommendations	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain different dismantling procedures  <b>Principles:</b> The student should explain the principles on how hinges and locks operate  <b>Theories:</b> The student should <ul style="list-style-type: none"> <li>Distinguish types of vehicle body shell</li> <li>Identify hinges and locks</li> </ul> <b>Circumstantial</b>	The following tools, equipment and safety gears are be available: <ul style="list-style-type: none"> <li>Work plan</li> <li>Tool box with spanners</li> <li>Adjustable/pipe wrenches</li> <li>G - pliers</li> <li>Hammers</li> <li>Overalls</li> <li>Leather boots</li> <li>Gloves</li> <li>Screw drivers</li> <li>Body jack</li> <li>Tape measure</li> <li>Chisels</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
			<b>Practical work:</b>  Organise the students into manageable groups and guide them to remove hinges and locks	<ul style="list-style-type: none"> <li>Clean the working place</li> <li>Store tools and equipment safely</li> </ul>		<b>knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>Safety precautions</li> <li>First aid</li> </ul>	<ul style="list-style-type: none"> <li>Clear goggles</li> </ul>	
	4.2 Carrying out straightening of bent vehicle frames	(a) Performing panel straightening by body jack	<b>Brainstorming:</b>  Guide the students to explain the concept of straightening the body frame by body jack  <b>Simulation:</b>  Provide the students with several videos to simulate various techniques of straightening the body panel using body jacks	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>Select tools and equipment</li> <li>Carry out adjustment and alignment</li> <li>Instruct others to assist in accordance</li> <li>Apply heating/welding/cut where need be</li> <li>Perform straightening</li> <li>Observe safety regulations</li> <li>Clean the</li> </ul>	The straightened vehicle body conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain the procedure used in straightening vehicle body by power jack  <b>Principles:</b> The student should state the principles of: <ul style="list-style-type: none"> <li>Taking measurements</li> <li>Setting power body jack</li> </ul> <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>Elaborate main</li> </ul>	The following tools, equipment and safety gears are available: <ul style="list-style-type: none"> <li>Working plan</li> <li>Power body jacks</li> <li>Hydraulic body</li> <li>Hand dollies assorted</li> <li>Oxy-acetylene welding plant</li> <li>Panel file</li> <li>Dolly heads and stand</li> <li>Sanding machine</li> <li>Beating files</li> <li>Ball pein hammer</li> <li>Safety boots</li> </ul>	62



Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Assessment		
			<b>Discussion:</b> Guide the students to formulate groups and moderate them to straighten the body frame by a body jack <b>Practical work:</b> Organise the students into manageable groups and guide them to straighten bent body frames by jacks	workplace and tools <ul style="list-style-type: none"> <li>• Store equipment and tools in safe custody</li> </ul>		fixtures of power hydraulic <ul style="list-style-type: none"> <li>• Describe properties of metals</li> </ul> <b>Circumstantial knowledge:</b> <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Safety precautions to be observed</li> <li>• First aid</li> </ul>	<ul style="list-style-type: none"> <li>• Leather apron</li> <li>• Leather gloves</li> <li>• Spanners</li> <li>• Levers</li> <li>• Wire brush</li> <li>• Chisels</li> <li>• Clamps</li> </ul>	
		(b) Performing heating and welding on bent vehicle body	<b>Brainstorming:</b> Guide the students to explain the concept of heating and	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Select tools and equipment</li> <li>• Instruct others to assist in</li> </ul>	The heated and welded vehicle body panel conforms to technical specifications	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The student should explain procedure used in	The following tools, equipment and safety gears are be available: <ul style="list-style-type: none"> <li>• Working plan</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
			welding body panel  <b>Demonstrate:</b>  Guide the students to formulate groups and demonstrate to them how to heat and weld body panel  <b>Practical work:</b>  Organise the students into manageable groups and guide them to straighten bent body panels by heating and weld	accordance <ul style="list-style-type: none"> <li>• Light the torch</li> <li>• Adjust welding flames</li> <li>• Apply heating/welding/cut where need be</li> <li>• Perform straightening</li> <li>• Grind the dented areas</li> <li>• Observe safety regulations</li> <li>• Clean the workplace and tools</li> <li>• Store equipment and tools in safe custody</li> </ul>		straightening vehicle body by heating and welding  <b>Principles:</b> The student should explain the principles of heating and welding body panel  <b>Theories:</b> The student should describe the properties of metals  <b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Safety precautions to be observed</li> <li>• First aid</li> </ul>	<ul style="list-style-type: none"> <li>• Power body jacks</li> <li>• Hydraulic body</li> <li>• Oxy-acetylene welding plant</li> <li>• Panel file</li> <li>• Beating files</li> <li>• Ball peen hammer</li> <li>• Safety boots</li> <li>• Leather apron</li> <li>• Leather gloves</li> <li>• Spanners</li> <li>• Levers</li> <li>• Wire brush</li> <li>• Chisels</li> <li>• Clamps</li> </ul>	
		(c) Performing file beating	<b>Demonstrate:</b>  Guide students to formulate groups and demonstrate	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Select tools and equipment</li> </ul>	The straightened vehicle body panel conforms to technical	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain	The following tools, equipment and safety gears are 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	Assessment		
			<p>to them how to use a beating file to strike a metal panel</p> <p><b>Practical work:</b></p> <p>Organise the students into manageable groups and guide them to straighten bent body panel by file and beating</p>	<ul style="list-style-type: none"> <li>Identify the affected areas</li> <li>Locate low or high spots, and strike the panels using beating tools</li> <li>Observe safety regulations</li> <li>Clean the workplace and tools</li> <li>Store equipment and tools in safe custody</li> </ul>	specifications	<p>the procedure used in straightening the vehicle body by file beating</p> <p><b>Principles:</b> The student should outline the principles of straightening the body panel by file-beating</p> <p><b>Theories:</b> The student should describe the properties of metals</p> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>Safety precautions to be observed</li> <li>First aid</li> </ul>	<ul style="list-style-type: none"> <li>Working plan</li> <li>Power body jacks</li> <li>Hydraulic body</li> <li>Oxy-acetylene welding plant</li> <li>Panel file</li> <li>Beating files</li> <li>Ball pein hammer</li> <li>Safety boots</li> <li>Leather apron</li> <li>Leather gloves</li> <li>Spanners</li> <li>Lever</li> <li>Wire brush</li> <li>Chisels</li> <li>Clamps</li> </ul>	
		(d) Performing body plastic filler	<p><b>Demonstrate:</b></p> <p>Guide students to formulate groups and demonstrate to them how to apply plastic</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>Select tools and equipment</li> <li>Perform straightening</li> </ul>	The heated and welded vehicle body panel conforms to technical specifications	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should explain procedures used in straightening the vehicle</p>	<p>The following tools, equipment and safety gears are available:</p> <ul style="list-style-type: none"> <li>Working plan</li> </ul>	

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				Process Assessment	Services Assessment	Assessment		
			filler  <b>Practical work:</b>  Organise the students into manageable groups and guide them to straighten the bent body panel by filling plastic filler	<ul style="list-style-type: none"> <li>Grind the dented areas</li> <li>Apply plastic fillers</li> <li>Observe safety regulations</li> <li>Clean the workplace and tools</li> <li>Store equipment and tools in safe custody</li> </ul>		body by filling the plastic filler  <b>Principles:</b> The student should explain the principles of applying plastic filler  <b>Theories:</b> The student should describe the properties of metals  <b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>Safety precautions to be observed</li> <li>First aid</li> </ul>	<ul style="list-style-type: none"> <li>Power body jacks</li> <li>Hydraulic body</li> <li>Oxy-acetylene welding plant</li> <li>Panel file</li> <li>Beating files</li> <li>Ball pein hammer</li> <li>Safety boots</li> <li>Leather apron</li> <li>Leather gloves</li> <li>Spanners</li> <li>Levers</li> <li>Wire brush</li> <li>Chisels</li> <li>Clamps</li> </ul>	
5 Performing repair of rusted body part	5.1 Carrying out welding of rusted parts	(a)  Performing patching	<b>Brainstorm:</b>  Guide the students to explain patching in repairing rusted parts  <b>Demonstrate:</b>	<b>The students should be able to:</b> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> <li>Cut and form metal sheets for patches</li> </ul>	A repaired rusted body part conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Method used:</b> The student should elaborate how to repair rusted body panel  <b>Principles:</b> The student	The following tools, equipment and safety gears are be available: <ul style="list-style-type: none"> <li>Work plan</li> <li>Gas welding plant</li> </ul>	65

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				Process Assessment	Services Assessment	Assessment		
			<p>Guide students to formulate groups and demonstrate to them how to patch the rusted body panel</p> <p><b>Practical work:</b></p> <p>Organise the students into manageable groups and guide them to repair rusted body panels by a patch</p>	<ul style="list-style-type: none"> <li>• Cut rusted areas with gas flame cutting</li> <li>• Regulate gas flames regularly</li> <li>• Select filler rods of proper sizes</li> <li>• Mend the panel</li> <li>• Tack a new panel in position</li> <li>• Weld completely and beat the surface/shut the gas off after work</li> <li>• Clean the workplace</li> <li>• Store tools in safe custody</li> <li>• Role gas pipes and store gas cylinders in</li> </ul>		<p>should state the principles of:</p> <ul style="list-style-type: none"> <li>• Preparing a metal patch</li> <li>• Perform patching</li> </ul> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Explain the importance of using a patch</li> <li>• Describe heat effect on metal</li> <li>• Outline the properties of materials</li> <li>• Elaborate gas welds techniques</li> </ul> <p><b>Circumstantial knowledge</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• Safety precautions to be observed</li> <li>• First aid</li> </ul>	<ul style="list-style-type: none"> <li>• Weld goggles</li> <li>• Hand snips</li> <li>• Panel hammers</li> <li>• Dolly blocks</li> <li>• Spark lighter</li> <li>• Body spoon</li> <li>• Cold chisel</li> <li>• Wire brush</li> <li>• Overall</li> <li>• Safely boots</li> <li>• Fire extinguishers</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
				proper way				
		(b) Performing panel beating	<p><b>Brainstorming:</b></p> <p>Guide the students to explain the concept of the panel beating in repairing rusted parts</p> <p><b>Simulation:</b></p> <p>Provide the students with several videos to simulate various techniques of performing panels beating</p> <p><b>Practical work:</b></p> <p>Organise the students into manageable groups and guide</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> <li>Regulate gas flames regularly</li> <li>Beat the surface</li> <li>Shut off the gas after work</li> <li>Clean the workplace</li> <li>Store tools in safe custody</li> </ul> <p>Role gas pipes and store gas cylinders in proper way</p>	A repaired rusted body part by striking conforms to technical specifications	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Method used:</b> The student should explain how to mend a rusted body panel</p> <p><b>Principles:</b> The student should explain the principles of:</p> <ul style="list-style-type: none"> <li>Surface straightening and smoothing</li> </ul> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>Explain the aim of panel-beating filler rods</li> <li>Describe properties of materials</li> </ul> <p><b>Circumstantial knowledge</b></p> <p><b>Detailed knowledge</b></p>	<p>The following tools, equipment and safety gears are be available:</p> <ul style="list-style-type: none"> <li>Work plan</li> <li>Gas welding plant</li> <li>Weld goggles</li> <li>Hand snips</li> <li>Panel hammers</li> <li>Dolly blocks</li> <li>Spark lighter</li> <li>Body spoon</li> <li>Cold chisel</li> <li>Wire brush</li> <li>Overall</li> <li>Safely boots</li> <li>Fire extinguishers</li> <li>Ball pein hammer</li> <li>Clamps</li> <li>Pliers</li> <li>Leather gloves</li> <li>Canvas spats</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
			them to perform panel beating in repairing a rusted body panel			<b>about:</b> <ul style="list-style-type: none"> <li>Safety precautions to be observed</li> <li>First aid</li> </ul>	<ul style="list-style-type: none"> <li>Leather</li> </ul>	
		(c) Performing body filler	<b>Demonstrate:</b> Guide students to formulate groups and demonstrate to them how to apply plastic filler  <b>Practical work:</b> Organise the students into manageable groups and guide them to perform filling the repaired body panel with body filler	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>Select tools and equipment</li> <li>Perform straightening</li> <li>Grind the dented areas</li> <li>Apply plastic fillers</li> <li>Observe safety regulations</li> <li>Clean the workplace and tools</li> <li>Store equipment and tools in safe custody</li> </ul>	The repaired body panel using filler conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Method used:</b> The student should explain the procedure used in filling the repaired body panel with filler  <b>Principles:</b> The student should state the principles of applying the filler on the repaired body panel  <b>Theories:</b> The student should describe the properties of materials  <b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b>	The following tools, equipment and safety gears are be available: <ul style="list-style-type: none"> <li>Work plan</li> <li>Weld goggles</li> <li>Body spoon</li> <li>Cold chisel</li> <li>Wire brush</li> <li>Overall</li> <li>Safely boots</li> <li>Fire extinguishers</li> <li>Panel harmer</li> <li>Clamps</li> <li>Pliers</li> <li>Leather gloves</li> <li>Canvas spats</li> <li>Leather aprons</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
						<ul style="list-style-type: none"> <li>Safety precautions to be observed</li> <li>First aid</li> </ul>		
		(d) Performing sanding	<p><b>Simulation:</b></p> <p>Provide the students with several videos to simulate various techniques of sanding plastic filler on the body panel</p> <p><b>Demonstrate:</b></p> <p>Guide students to formulate groups and demonstrate to them how to sand plastic filler</p> <p><b>Practical work:</b></p> <p>Organise the students into manageable groups and guide them to sand</p>	<p><b>The students should be able to:</b></p> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> <li>Sand the surface by using sanding machine</li> <li>Sand the surface clearly using sand paper</li> <li>Clean the work place</li> <li>Store tools in safe custody</li> </ul>	The repaired body panel sanded conforms to technical specifications	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Method used:</b> The student should explain procedures used in sanding filled rusted body</p> <p><b>Principles:</b> The student should state the principles of sanding body filler on the repaired body panel</p> <p><b>Theories:</b> The student should :</p> <ul style="list-style-type: none"> <li>Outline methods of sanding filled body panel</li> <li>Describe the properties of metals</li> </ul> <p><b>Circumstantial knowledge:</b></p>	<p>The following tools, equipment and safety gears are be available:</p> <ul style="list-style-type: none"> <li>Work plan</li> <li>Weld goggles</li> <li>Body spoon</li> <li>Cold chisel</li> <li>Wire brush</li> <li>Overall</li> <li>Safely boots</li> <li>Fire extinguishers</li> <li>Ball pein hammer</li> <li>Clamps</li> <li>Pliers</li> <li>Leather gloves</li> <li>Canvas spats</li> <li>Leather aprons</li> </ul>	



Module Title (Main Competence)	Unit 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	Assessment		
			plastic filler on the repaired body panel			<b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>Safety precautions to be observed</li> <li>First aid</li> </ul>		
	5.2 Carrying out mild steel arc cutting	(a) Performing arc cutting on dented frame	<b>Brainstorming:</b>  Guide the students to explain arc cutting on the dents vehicle frame  <b>Simulation:</b>  Provide the students with several videos to simulate various techniques of arc cutting on the rusted body panel  <b>Practical work:</b>  Organise the students into manageable	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> <li>Inspect the machine, cable and electrode holder</li> <li>Interpret working drawing</li> <li>Set recommended current for frame cutting</li> <li>Select electrodes of proper sizes</li> </ul> Cut off dented areas with arc-	A cut of dented body frame conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Method used:</b> The student should explain procedures for cutting dented body frame  <b>Principles:</b> The student should state the principles of repairing a dented body frame  <b>Theories:</b> The student should:  <ul style="list-style-type: none"> <li>Elaborate types of dents</li> <li>Outline the effect of dents</li> <li>Describe the properties of metals</li> </ul> <b>Circumstantial</b>	The following tools, equipment and safety gears are be available: <ul style="list-style-type: none"> <li>Work plan</li> <li>Gas welding plant</li> <li>Arc welding machine</li> <li>Weld goggles</li> <li>Panel hammers</li> <li>Dolly blocks</li> <li>Spark lighter</li> <li>Body spoon</li> <li>Cold chisel</li> <li>Wire brush</li> <li>Overall</li> <li>Safely boots</li> <li>Fire extinguishers</li> <li>Ball pein hammer</li> </ul>	52

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				Process Assessment	Services Assessment	Assessment		
			groups and guide them to cut dented vehicle frame	cutting <ul style="list-style-type: none"> <li>Observe safety regulation rules</li> <li>Clean the workplace</li> <li>Store tools in safe custody</li> </ul>		<b>knowledge:</b> <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>Safety precautions to be observed first aid</li> </ul>	<ul style="list-style-type: none"> <li>Clamps</li> <li>Tongs</li> <li>Pliers</li> <li>Leather gloves</li> <li>Canvas spats</li> <li>Leather aprons.</li> </ul>	
		(b) Performing arc gouging	<b>Brainstorming:</b> Guide the students to describe arc gouging  <b>Simulation:</b> Provide the students with several videos to simulate various arc gouging on cutting rusted body parts  <b>Practical work:</b> Organise the students into	<b>The students should be able to:</b> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> <li>Interpret working drawing</li> <li>Set recommended current and air flow pressure</li> <li>Control electrode travel speed along the cut</li> <li>Observe safety regulation rules</li> </ul>	Arc gouging on rusted body parts conform to technical specifications	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Method used:</b> The student should explain procedures for cutting rusted body frame by arc gouging  <b>Principles:</b> The student should outline the principles of performing arc gouging  <b>Theories:</b> The student should explain Arc gouging process on cutting rusted frame <b>Circumstantial knowledge:</b>	The following tools, safety gears and equipment are to be available: <ul style="list-style-type: none"> <li>Work plan</li> <li>Gas welding plant</li> <li>Arc welding machine</li> <li>Weld goggles</li> <li>Panel hammers</li> <li>Dolly blocks</li> <li>Spark lighter</li> <li>Body spoon</li> <li>Cold chisel</li> <li>Wire brush</li> <li>Overall</li> <li>Safely boots</li> </ul>	

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				Process Assessment	Services Assessment	Assessment		
			manageable groups and guide them to perform arc gouging on rusted body parts	<ul style="list-style-type: none"> <li>Clean the work place</li> <li>Store tools in safe custody</li> </ul>		<b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>Safety precautions to be observed</li> <li>First aid</li> </ul>	<ul style="list-style-type: none"> <li>Fire extinguishers</li> <li>Ball pein hammer</li> <li>Clamps</li> <li>Tongs</li> <li>Pliers</li> <li>Leather gloves</li> <li>Canvas spats</li> <li>Leather aprons</li> </ul>	
6 Performing alignment of vehicle body panels	6.1 Carrying out alignment of vehicle body panels	(a) Fixing the bonnet, boot and door	<b>Brainstorming:</b> Guide the students to describe fixing the body panel on the body structure  <b>Simulation:</b> Provide the students with several videos to simulate various techniques of fixing body panels such as doors, bonnets and boot on the	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> <li>Select proper spanners for fixing parts</li> <li>Apply body jack and levers to align the fixed body panel</li> <li>Select the pushing or pulling points</li> <li>Select the anchor points for alignment</li> </ul>	The fixed body panel conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Method used:</b> The student should explain procedures for fixing body panel  <b>Principles:</b> The student should explain the principles of fixing body parts  <b>Theories:</b> The student should explain the body panel fixing processes  <b>Circumstantial knowledge:</b>  <b>Detailed knowledge</b>	The following tools, equipment and safety gears are to be available: <ul style="list-style-type: none"> <li>Hydraulic body jack</li> <li>Toolbox (spanners)</li> <li>Levers/extensions</li> <li>Hammer</li> <li>Screw drivers</li> <li>Overall</li> <li>Leather gloves</li> <li>Punch</li> <li>Safety boots</li> <li>Pusher heads</li> <li>Light hammer</li> </ul>	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	Assessment		
			body structure  <b>Practical work:</b>  Organise the students into manageable groups and guide them to fix body panels on the body structure	<ul style="list-style-type: none"> <li>Observe safety regulations</li> <li>Clean the workplace</li> <li>Store tools and equipment in safe custody</li> </ul>		<b>about:</b> <ul style="list-style-type: none"> <li>Safety precautions to be observed</li> <li>First aid</li> </ul>	<ul style="list-style-type: none"> <li>Tape measure</li> <li>Combination pliers</li> </ul>	
		(b) Performing vehicle body panel alignment	<b>Brainstorming:</b>  Guide the students to describe the alignment of body panels on the body structure  <b>Demonstration:</b>  Guide students to formulate groups and demonstrate to them how to align various body panels on	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> <li>Select proper spanners for fixing parts</li> <li>Apply body jack and levers to align the fixed body panel</li> <li>Select the pushing or pulling points</li> </ul>	The aligned body panel conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>The method used:</b> The student should explain procedures for aligning the panel on the body structure  <b>Principles:</b> The student should state the principles of aligning body parts  <b>Theories:</b> The student should explain body panel alignment	The following tools, equipment and safety gears are to be available: <ul style="list-style-type: none"> <li>Hydraulic body jack</li> <li>Toolbox (spanners)</li> <li>Levers/extensions</li> <li>Hammer</li> <li>Screwdrivers</li> <li>Overall</li> <li>Leather gloves</li> <li>Punch</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
			the vehicle structure  <b>Practical work:</b>  Organise the students into manageable groups and guide them to align body panels on the body structure	<ul style="list-style-type: none"> <li>Select the anchor points for alignment</li> <li>Inspect for correctness</li> <li>Observe safety regulations</li> </ul>		processes  <b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>Safety precautions to be observed</li> <li>First aid</li> </ul>	<ul style="list-style-type: none"> <li>Safety boots</li> <li>Pusher heads</li> <li>Light hammer</li> <li>Tape measure</li> <li>Combination pliers</li> </ul>	
		(c) Tightening the attachments	<b>Demonstration:</b>  Guide students to formulate groups and demonstrate to them how to tighten various body panels on the vehicle structure  <b>Practical work:</b>  Organise the students into	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> <li>Select proper spanners for tightening</li> <li>Strengthen the damaged body part</li> <li>Inspect for correctness</li> </ul>	The tightened body parts conform to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Method used:</b> The student should explain procedures of tightening body as per specifications  <b>Principles:</b> The student should state the principles of parts and components tightening  <b>Theories:</b> The student	The following tools, equipment and safety gears are be available: <ul style="list-style-type: none"> <li>Hydraulic body jack</li> <li>Toolbox (spanners)</li> <li>Levers/extensions</li> <li>Hammer</li> <li>Screw drivers</li> <li>Overall</li> <li>Leather gloves</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
			manageable groups and guide them to tighten various body parts as per specifications	<ul style="list-style-type: none"> <li>Observe safety regulation</li> <li>Clean the workplace</li> <li>Store tools and equipment in safe custody</li> </ul>		<p>should explain the body panel tightening processes</p> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>Safety precautions to be observed</li> <li>First aid</li> </ul>	<ul style="list-style-type: none"> <li>Punch</li> <li>Safety boots</li> <li>Pusher heads</li> <li>Light hammer</li> <li>Tape measure</li> <li>Combination pliers</li> </ul>	
	6.2 Carrying out sanding of vehicle body panels	(a) Sanding by disc sanding machine	<p><b>Brainstorming:</b></p> <p>Guide the students to describe the machine sanding process</p> <p><b>Demonstration:</b></p> <p>Guide students to formulate groups and demonstrate to them how to perform sanding of filled body panel using a</p>	<p><b>The students should be able to:</b></p> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> <li>Connect sending disc to the grinder</li> <li>Identify starting areas</li> <li>Sand the surface</li> <li>Use body file at corners</li> <li>Dust out</li> </ul>	Sanded body panel conforms to technical specifications	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Method used:</b> The student should explain machine sanding process</p> <p><b>Principles:</b> The student should state the principles of grinding and sanding of body parts</p> <p><b>Theories:</b> The student should explain body panel sanding process</p>	<p>The following tools, equipment and safety gears are be available:</p> <ul style="list-style-type: none"> <li>Body files</li> <li>Disc grinding machine (sand disc) and its spanner</li> <li>Clear goggles</li> <li>Hand sanding plate</li> <li>Nose mask</li> <li>Overall</li> </ul>	62

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				Process Assessment	Services Assessment	Assessment		
			sanding machine  <b>Practical work:</b>  Organise the students into manageable groups and guide them to perform machine sanding	<ul style="list-style-type: none"> <li>Switch of sanding machine</li> <li>Observe safety regulation</li> <li>Clean the tools and store them in safe custody</li> </ul>		using machine  <b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>Safety precautions to be observed</li> </ul>	<ul style="list-style-type: none"> <li>Apron</li> <li>Safety glasses</li> <li>Sand papers (assorted)</li> <li>Water bath</li> <li>Electrical power supply</li> </ul>	
		(b)Checking for surface correctness	<b>Brainstorming:</b>  Guide the students to describe the checking process  <b>Demonstration:</b>  Guide students to formulate groups and demonstrate to them how to check surface correctness and finish after sanding	<b>The students should be able to:</b> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> <li>Connect sending disc to the grinder</li> <li>Identify polishing areas</li> <li>Sand the surface for polish</li> <li>Use sanding paper on the curved areas</li> </ul>	Sanded body panel surface conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Method used:</b> The student should explain the process of checking correctness  <b>Principles:</b> The student should state the principles of checking surface finish on sanded body parts  <b>Theories:</b> The student should explain body panel surface finishing	The following tools, equipment and safety gears are to be available: <ul style="list-style-type: none"> <li>Body files</li> <li>Disc grinding machine (sand disc) and its spanner</li> <li>Clear goggles</li> <li>Hand sanding plate</li> <li>Nose mask</li> <li>Overall</li> <li>Apron</li> </ul>	

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				Process Assessment	Services Assessment	Assessment		
			<b>Practical work:</b> Organise the students into manageable groups and guide them to check surface finish after sanding	<ul style="list-style-type: none"> <li>Dust out</li> <li>Switch of sanding machine</li> <li>Observe safety regulations</li> <li>Clean the tools and store them in safe custody</li> </ul>		<b>Circumstantial knowledge:</b> <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>Safety precautions to be observed</li> <li>First aid</li> </ul>	<ul style="list-style-type: none"> <li>Safety glasses</li> <li>Sand papers (assorted)</li> <li>Water bath</li> <li>Electrical power supply</li> </ul>	
		(c) Re-applying body filler	<b>Demonstration:</b> Guide students to formulate groups and demonstrate to them how to re-apply the body filler on the panel  <b>Practical work:</b> Organise the students into manageable groups and guide them to re-apply	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> <li>Inspect the surface</li> <li>Mix the plastic filler with hardener</li> <li>Apply the plastic filler on a surface</li> <li>Weight for cure</li> <li>Sand down the</li> </ul>	Re-applied body filler conforms to technical specifications	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Method used:</b> The student should explain how to re-apply body filler on the sanded surface <b>Principles:</b> The student should outline the principles of checking surface finish on sanded body parts <b>Theories:</b> The student should elaborate on the purpose of re-applying	The following tools, equipment and safety gears are to be available: <ul style="list-style-type: none"> <li>Body files</li> <li>Disc grinding machine (sand disc) and its spanner</li> <li>Clear goggles</li> <li>Hand sanding plate</li> <li>Nose mask</li> <li>Overall</li> <li>Apron</li> </ul>	



Module Title (Main Competence)	Unit 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	Assessment		
			the body filler	surface <ul style="list-style-type: none"> <li>• Recheck for corrections</li> <li>• Re-torch the filler</li> <li>• Observe safety regulations</li> <li>• Clean tools and store them in safe custody</li> </ul>		body panel surface filler  <b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Safety precautions to be observed</li> <li>• First aid</li> </ul>	<ul style="list-style-type: none"> <li>• Safety glasses</li> <li>• Sand papers (assorted)</li> <li>• Water bath</li> <li>• Electrical power supply</li> </ul>	
		(d) Re-sanding	<b>Demonstration:</b>  Guide students to formulate groups and demonstrate to them how to re-sanding the filled body panel using a sanding machine  <b>Practical work:</b>  Organise the students into manageable groups and guide them to re-sand	<b>The students should be able to:</b> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Sand the surface by using sanding machine</li> <li>• Sand the surface clearly using sand paper</li> <li>• Clean the work place</li> </ul>	Re- sand body panel conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Method used:</b> The student should elaborate how to re-sand body filler on surface  <b>Principles:</b> The student should highlight the principles of re-sanding body fillers  <b>Theories:</b> The student should explain the process of re-sanding filler on body panel	The following tools, equipment and safety gears are to be available: <ul style="list-style-type: none"> <li>• Body files</li> <li>• Disc grinding machine (sand disc) and its spanner</li> <li>• Clear goggles</li> <li>• Hand sanding plate</li> <li>• Nose mask</li> <li>• Overall</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
			filled body panel	<ul style="list-style-type: none"> <li>Store tools in safe custody</li> </ul>		surface  <b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>Safety precautions to be observed</li> <li>First aid</li> </ul>	<ul style="list-style-type: none"> <li>Apron</li> <li>Safety glasses</li> <li>Sand papers (assorted)</li> <li>Water bath</li> <li>Electrical power supply</li> </ul>	
		(e) Applying undercoat paint	<b>Simulation:</b>  Provide the students with several videos to simulate techniques of applying undercoat paint on body panels  <b>Demonstration:</b>  Guide students to formulate groups and demonstrate	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> <li>Sand the surface by using a sanding machine</li> <li>Sand the surface using fine sandpaper</li> <li>Wash the panel surface with clean water</li> </ul>	Applied undercoat paint on the body panel conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Method used:</b> The student should elaborate on how to apply undercoat paint  <b>Principles:</b> The student should state the principles of applying undercoat paint  <b>Theories:</b> The student should elaborate on the process of applying undercoat paint on body panel surface	The following tools, equipment and safety gears are to be available: <ul style="list-style-type: none"> <li>Body files</li> <li>Spray gun</li> <li>Air compressor machine</li> <li>Hand sanding plate</li> <li>Nose mask</li> <li>Overall</li> <li>Apron</li> <li>Safety glasses</li> <li>Sandpapers</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
			to them how to apply undercoat paint <b>Practical work:</b>  Organise the students into manageable groups and guide them to apply undercoat paint body panel	<ul style="list-style-type: none"> <li>Cover all unpainted areas with paper and</li> <li>Apply undercoat paint</li> <li>Clean the workplace</li> <li>Store tools in safe custody</li> </ul>		<b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>Safety precautions to be observed</li> </ul>	(assorted) <ul style="list-style-type: none"> <li>Water bath</li> <li>Electrical power supply</li> </ul>	
7 Performing thick metal cutting by a gas flame	7.1 Carrying out gas cutting on thin metal plates	(a) Performing metal selection	<b>Brainstorming:</b> Guide the students to explain the procedures for the metal selection  <b>Practical work:</b> Organise the students into manageable groups and guide them to select metals based on size and	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> <li>Select metal thickness</li> <li>Interpret working drawing</li> <li>Mark the workpiece</li> <li>Measure the limits</li> <li>Observe safety</li> </ul>	Metal selected as per technical specifications	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Method used:</b> The student should explain how to select metals <b>Principles:</b> The student should describe the principles used to select metals <b>Theories:</b> The student should explain the processes of selecting metals <b>Circumstantial knowledge:</b>	The following tools, equipment and safety gears are be available: <ul style="list-style-type: none"> <li>Working drawing</li> <li>Gas welding plant</li> <li>Cutting torch</li> <li>Cutting attachment</li> <li>Spark lighter</li> <li>Divider</li> <li>Chalk (white)</li> <li>Steel rule</li> <li>Measuring tape</li> </ul>	19

Module Title (Main Competence)	Unit 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	Assessment		
			properties	regulations <ul style="list-style-type: none"> <li>• Clean the working area</li> <li>• Clean tools and equipment</li> <li>• Store tools and equipment in safety place</li> </ul>		<b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Safety precautions to be observed</li> <li>• First aid</li> </ul>	<ul style="list-style-type: none"> <li>• Overall</li> <li>• Leather apron</li> <li>• Industrial boots</li> </ul>	
		(b) Performing metal cutting	<b>Demonstration:</b> Guide students to formulate groups and demonstrate to them how to cut thin metal plates using gas flame  <b>Practical work:</b> Organise the students into manageable groups and guide them to cut thin metals with gas	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Prepare and inspect the gas welding plant</li> <li>• Interpret working drawing</li> <li>• Regulate the flame</li> <li>• Perform the metal cutting</li> <li>• Shut off gas regulators</li> <li>• Inspect the</li> </ul>	Thin metal gas cut workpiece conforms to technical specifications	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Method used:</b> The student should elaborate how to cut thin metal by gas  <b>Principles:</b> The student should explain the principles used to cut thin metal by gas  <b>Theories:</b> The student should explain the processes of cutting thin metal by gas <b>Circumstantial knowledge:</b> <b>Detailed knowledge</b>	The following tools, equipment and safety gears are be available: <ul style="list-style-type: none"> <li>• Working drawing</li> <li>• Gas welding plant</li> <li>• Cutting torch</li> <li>• Cutting attachment</li> <li>• Spark lighter</li> <li>• Divider</li> <li>• Chalk (white)</li> <li>• Steel rule</li> <li>• Measuring tape</li> <li>• Overall</li> <li>• Leather apron</li> <li>• Industrial boots</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
				correctness <ul style="list-style-type: none"> <li>Observe safety regulation</li> <li>Clean the working area</li> <li>Clean tools and equipment</li> <li>Store tools and equipment in a safe place</li> </ul>		<b>about:</b> <ul style="list-style-type: none"> <li>Safety precautions to be observed</li> <li>First aid</li> </ul>	<ul style="list-style-type: none"> <li>Leather gloves</li> <li>Tongs</li> <li>Welding goggles</li> <li>Hammer</li> <li>Chisel</li> <li>Try square</li> </ul>	
	7.2 Carrying out gas cutting on thick metal plates	(a) Performing metal selection	<b>Discussions:</b> Guide the students to discuss on thick metal gas-cutting  <b>Practical work:</b> Organise the students into manageable groups and guide them to select material based on material properties and size	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> <li>Select metal thickness</li> <li>Interpret working drawing</li> <li>Mark the workpiece</li> <li>Measure the limits</li> <li>Observe safety regulations</li> <li>Clean the</li> </ul>	Thick metal gas cut workpiece conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Method used:</b> The student should explain how to cut thick metal by gas  <b>Principles:</b> The student should state the principles used to cut thick metal by gas  <b>Theories:</b> The student should elaborate the	The following tools, equipment and safety gears are available: <ul style="list-style-type: none"> <li>Working drawing</li> <li>Gas welding plant</li> <li>Cutting torch</li> <li>Cutting attachment</li> <li>Spark lighter</li> <li>Divider</li> <li>Chalk (white)</li> <li>Steel rule</li> <li>Measuring tape</li> <li>Overall</li> </ul>	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	Assessment		
				working area <ul style="list-style-type: none"> <li>• Clean tools and equipment</li> <li>• Store tools and equipment in a safe place</li> </ul>		processes of cutting thick metal by gas  <b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Safety precautions to be observed</li> <li>• First aid</li> </ul>	<ul style="list-style-type: none"> <li>• Leather apron</li> <li>• Industrial boots</li> <li>• Leather gloves</li> <li>• Welding goggles</li> <li>• Hammer</li> <li>• Chisel</li> <li>• Try square</li> </ul>	
		(b) Performing blow pipe pressure setting	<b>Discussions:</b>  Guide the students to explain the working principles of blowpipe  <b>Simulation:</b> Provide the students with several videos to simulate how to perform blow pipe pressure	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Prepare and inspect gas welding plant</li> <li>• Set cutting pressure on the regulator</li> <li>• Regulate the flame</li> <li>• Observe safety regulations</li> <li>• Clean the</li> </ul>	Blow pipe pressure set as per specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Method used:</b> The student should explain how to set blow pipe pressure for cutting  <b>Principles:</b> The student should outline the principles used to set blow pipe pressure for cutting	The following tools, equipment and safety gears are to be available: <ul style="list-style-type: none"> <li>• Working drawing</li> <li>• Gas welding plant</li> <li>• Cutting torch</li> <li>• Cutting attachment</li> <li>• Spark lighter</li> <li>• Divider</li> <li>• Chalk (white)</li> <li>• Steel rule</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
			setting <b>Practical work:</b> Organise the students into manageable groups and guide them to perform blow pipe pressure setting for thick metal cutting	working area <ul style="list-style-type: none"> <li>Clean tools and equipment</li> <li>Store tools and gas plant in safety</li> </ul>		<b>Theories:</b> The student should explain the processes of cutting thick metal by gas  <b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>Safety precautions to be observed</li> <li>First aid</li> </ul>	<ul style="list-style-type: none"> <li>Measuring tape</li> <li>Overall</li> <li>Leather apron</li> <li>Industrial boots</li> <li>Leather gloves</li> <li>Tongs</li> <li>Welding goggles</li> <li>Hammer</li> <li>Chisel</li> <li>Try square</li> </ul>	
		(c) Performing metal cutting	<b>Brainstorming:</b> Guide the students to explain thick metal cutting processes by gas flame  <b>Simulation:</b> Provide the students with several videos to simulate techniques of	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> <li>Prepare and inspect gas welding plant</li> <li>Interpret working drawing</li> <li>Regulate the flame</li> <li>Perform the</li> </ul>	Gas cut workpiece conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Method used:</b> The student should explain how to cut thick metals using gas  <b>Principles:</b> The student should state the principles of gas cutting on thick metals	The following tools, equipment and safety gears are to be available: <ul style="list-style-type: none"> <li>Working drawing</li> <li>Gas welding plant</li> <li>Cutting torch</li> <li>Cutting attachment</li> <li>Spark lighter</li> <li>Divider</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
			cutting thick metals by gas flame  <b>Demonstration:</b>  Guide students to formulate groups and demonstrate to them how to cut thick metal plates using gas flame  <b>Practical work:</b>  Organise the students into manageable groups and guide them to cut thick metal with gas	metal cutting <ul style="list-style-type: none"> <li>Shut off gas regulators</li> <li>Chip of slag's</li> <li>Inspect the correctness</li> <li>Observe safety regulation</li> <li>Clean the working area</li> <li>Clean tools and equipment</li> <li>Store tools and gas plant in a safe place</li> </ul>		<b>Theories:</b> The student should explain the processes of cutting thick metal by gas  <b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>Safety precautions to be observed</li> <li>First aid</li> </ul>	<ul style="list-style-type: none"> <li>Chalk (white)</li> <li>Steel rule</li> <li>Measuring tape</li> <li>Overall</li> <li>Leather apron</li> <li>Industrial boots</li> <li>Leather gloves</li> <li>Tongs</li> <li>Welding goggles</li> <li>Hammer</li> <li>Chisel</li> <li>Try square</li> </ul>	
8 Performing vehicle body plastic filling	8.1 Carrying out plastic filling on rigid body panel	(a) Performing preparation of surface and material	<b>Brainstorming:</b>  Guide the students to explain the preparation of	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> </ul>	The body surface prepared and material selection conforms to technical	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Method used:</b> The student should explain the requirements and	The following tools, equipment and safety gears are to be available:	24



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				Process Assessment	Services Assessment	Assessment		
			<p>materials and surface</p> <p><b>Demonstration:</b></p> <p>Guide students to formulate groups and demonstrate to them how to material and panel surface for plastic filling</p> <p><b>Practical work:</b></p> <p>Organise the students into manageable groups and guide them to select materials and prepare surfaces for plastic filling</p>	<ul style="list-style-type: none"> <li>Inspect the surface</li> <li>Prepare the body filler and its accessories</li> <li>Select body file</li> <li>Select sanding papers</li> <li>Select sanding machines</li> <li>Observe safety regulations</li> <li>Clean the work area</li> <li>Store tools and materials safely</li> </ul>	specifications	<p>steps for applying the filler</p> <p><b>Principles:</b> The student should describe the principles of:</p> <ul style="list-style-type: none"> <li>Body filling</li> <li>Body filler material mixing ratio</li> <li>Curing time and reasons</li> <li>Selection of body fillers</li> </ul> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>Distinguish between different types of body fillers</li> <li>Describe properties of materials</li> <li>Explain the purpose of body filling</li> </ul> <p><b>Circumstantial</b></p>	<ul style="list-style-type: none"> <li>Piece of glass sheet</li> <li>Scrapers</li> <li>Rubbers squish spreader</li> <li>Gloves</li> <li>Nose mask</li> <li>Apron</li> <li>Overall</li> <li>Hand disc grinder machine</li> <li>Safety goggles</li> <li>Clear glass</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
						<b>knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>Safety precautions to be observed while body filling</li> <li>First aid</li> </ul>		
		(b) Performing body filler	<b>Brainstorming:</b>  Guide the students to explain body surface filling  <b>Practical work:</b>  Organise the students into manageable groups and guide them to perform surface-filling on the rigid body	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> <li>Inspect the surface</li> <li>Mix the plastic filler with hardener</li> <li>Apply the plastic filler on a dented surface</li> <li>Weight for cure</li> <li>Sand down the</li> </ul>	The body filled surface conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Method used:</b> The student should explain body filler mixing techniques  <b>Principles:</b> The student should explain the principles of: <ul style="list-style-type: none"> <li>Mixing body filler</li> <li>Applications of body filler in the surface</li> <li>Applying the body filler</li> </ul>	The following tools, equipment and safety gears are be available: <ul style="list-style-type: none"> <li>Piece of glass sheet</li> <li>Scrapers</li> <li>Rubbers squish spreader</li> <li>Gloves</li> <li>Body file</li> <li>Nose mask</li> <li>Apron</li> <li>Overall</li> <li>Hand disc grinder machine</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
				surface <ul style="list-style-type: none"> <li>• Recheck for corrections</li> <li>• Observe safety regulations</li> <li>• Clean the work area</li> <li>• Store tools and materials</li> </ul>		<b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>• Elaborate types of body fillers</li> <li>• Describe properties of materials</li> <li>• Identify tools used</li> <li>• Explain the purpose of body filling</li> </ul> <b>Circumstantial knowledge:</b> <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Safety precautions to be observed</li> <li>• First aid</li> </ul>	<ul style="list-style-type: none"> <li>• Safety goggles</li> <li>• Clear glass</li> </ul>	
		(c) Performing initial and final grinding	<b>Discussion: :</b> Guide the students to discuss the	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Select tools, equipment and</li> </ul>	The grinded body surface conforms to technical specifications	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Method used:</b> The student should explain	The following tools, equipment and safety gears are 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	Assessment		
			<p>difference between initial and final filled body panel grinding</p> <p><b>Practical work:</b></p> <p>Organise the students into manageable groups and guide them to perform initial and final grinding of filled body panel with plastic body filler</p>	<p>safety gears</p> <ul style="list-style-type: none"> <li>Inspect the surface</li> <li>Mix the plastic filler with hardener</li> <li>Apply the plastic filler on a dented surface</li> <li>Weigh for cure</li> <li>Sand down the surface</li> <li>Recheck for corrections</li> <li>Polish/clean</li> <li>Observe safety regulations</li> <li>Clean the work area</li> </ul>		<p>filler grinding processes</p> <p><b>Principles:</b> The student should outline the principles of:</p> <ul style="list-style-type: none"> <li>Body filler grinding</li> <li>Purpose of grinding</li> <li>Methods of grinding</li> </ul> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>Explain types of body fillers</li> <li>Describe properties of materials</li> <li>Identify tools and equipment</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>Safety precautions to be observed</li> <li>First aid</li> </ul>	<ul style="list-style-type: none"> <li>Piece of glass sheet</li> <li>Scrapers</li> <li>Rubbers squish spreader</li> <li>Gloves</li> <li>Nose mask</li> <li>Apron</li> <li>Overall</li> <li>Hand disc grinder machine</li> <li>Safety goggles</li> <li>Clear glass</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
	8.2 Carrying out fibber glass filling	(a) Performing preparation of panel surface and material	<p><b>Brainstorming:</b></p> <p>Guide the students to explain the concept of fiber glass technology in filling body surface</p> <p><b>Discussion:</b></p> <p>Guide the students to discuss on fiber glass technology in repairing vehicle body panels</p> <p><b>Practical work:</b></p> <p>Organise the students into manageable groups and guide them to select materials and</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Inspect the surface</li> <li>• Prepare the fibber and its accessories</li> <li>• Select body file</li> <li>• Select sanding papers</li> <li>• Select sanding machines</li> <li>• Observe safety regulation</li> <li>• Clean the work area</li> </ul> <p>Store tools and materials safely</p>	The prepared body surface conforms to technical specifications	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Method used:</b> The student should explain the requirements and steps of preparing fibber materials</p> <p><b>Principles:</b> The student should explain the principles of:</p> <ul style="list-style-type: none"> <li>• Fibber filling</li> <li>• Fibber material mixing ratio</li> <li>• Curing time and reasons</li> <li>• Selection of resin materials</li> </ul> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Explain types of fibbers</li> <li>• Describe the properties of</li> </ul>	<p>The following tools, equipment and safety gears are be available:</p> <ul style="list-style-type: none"> <li>• Piece of glass sheet</li> <li>• Scrapers</li> <li>• Rubbers squish spreader</li> <li>• Gloves</li> <li>• Nose mask</li> <li>• Apron</li> <li>• Overall</li> <li>• Hand disc grinder machine</li> <li>• Safety goggles</li> </ul> <p>Clear glass</p>	24

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				Process Assessment	Services Assessment	Assessment		
			prepare surface for filling			materials <ul style="list-style-type: none"> <li>Elaborate the purpose of fibber filling</li> </ul> <b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>Safety precautions to be observed while fibber filling</li> <li>First aid</li> </ul>		
		(b) Performing fibber glass filling	<b>Simulation:</b>  Provide the students with several videos to simulate techniques of performing fiberglass filling on body panels  <b>Demonstration:</b>  Guide students to	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> <li>Inspect the surface</li> <li>Mix the fibber with hardener</li> <li>Apply the fibber on a dented surface</li> </ul>	The fibber glass filled surface conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Method used:</b> The student should explain fibber material mixing techniques  <b>Principles:</b> The student should Describe the principles of: <ul style="list-style-type: none"> <li>Mixing fibber</li> </ul>	The following tools, equipment and safety gears are to be available: <ul style="list-style-type: none"> <li>Piece of glass sheet</li> <li>Scrapers</li> <li>Rubbers squish spreader</li> <li>Gloves</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
			formulate groups and demonstrate to them how to perform fiberglass filling  <b>Practical work:</b>  Organise the students into manageable groups and guide them to perform surface filling using fiberglass	<ul style="list-style-type: none"> <li>• Weight for cure</li> <li>• Sand down the surface</li> <li>• Recheck for corrections</li> <li>• Observe safety regulations</li> <li>• Clean the work area</li> <li>• Store tools and materials</li> </ul>		materials <ul style="list-style-type: none"> <li>• Applications of fibber on the surface</li> <li>• Applying the fibber glass</li> </ul> <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>• Elaborate the types of fibber glass materials</li> <li>• Explain the types of resin used for fibber glass</li> <li>• Describe the properties of materials</li> <li>• Identify the tools used</li> <li>• Highlight purpose of fibber glass</li> </ul> <b>Circumstantial knowledge:</b>	<ul style="list-style-type: none"> <li>• Body file</li> <li>• Nose mask</li> <li>• Apron</li> <li>• Overall</li> <li>• Hand disc grinder machine</li> <li>• Safety goggles</li> <li>• Clear glass</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
						<b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>Safety precautions to be observed</li> <li>First aid</li> </ul>		
		(c) Performing initial and final fibber grinding/sanding	<b>Demonstration:</b> Guide students to formulate groups and demonstrate to them how to perform initial and final fiberglass sanding  <b>Practical work:</b> Organise the students into manageable groups and guide them to grind and sand the panel filled with fiberglass	<b>The students should be able to:</b> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> <li>Inspect the surface</li> <li>Grind the surface</li> <li>Apply the plastic filler on a fibber surface</li> <li>Weight for cure</li> <li>Sand down the surface</li> <li>Polish/clean</li> <li>Observe safety regulation</li> <li>Clean the work</li> </ul>	The grinded body surface conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Method used:</b> The student should explain fibber grinding processes  <b>Principles:</b> The student should state the principles of: <ul style="list-style-type: none"> <li>Body fibber grinding</li> <li>Purpose of grinding</li> <li>Methods of grinding</li> </ul> <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>Explain the types of fibreglass materials</li> <li>Describe the</li> </ul>	The following tools, equipment and safety gears are to be available: <ul style="list-style-type: none"> <li>Piece of glass sheet</li> <li>Scrapers</li> <li>Rubbers squish spreader</li> <li>Gloves</li> <li>Nose mask</li> <li>Apron</li> <li>Overall</li> <li>Hand disc grinder machine</li> <li>Safety goggles</li> <li>Clear glass</li> </ul>	



Module Title (Main Competence)	Unit 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	Assessment		
				area		properties of materials <ul style="list-style-type: none"> <li>List down the tools and equipment</li> </ul> <b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>Safety precautions to be observed</li> <li>First aid</li> </ul>		
9 Performing painting on a vehicle body panel	9.1 Carrying out painting on the exterior body panel	(a) Inspecting the exterior body	<b>Brainstorming:</b>  Guide the students to describe the vehicle's exterior body inspection  <b>Simulation:</b>  Provide the students with several videos to simulate techniques of	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> <li>Remove dirt from the panel surface</li> <li>Apply sand paper to remove rust and old paint</li> <li>Clean the</li> </ul>	The exterior body surface conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Method used:</b> The student should explain the panel painting procedures  <b>Principles:</b> The student should describe the principles of: <ul style="list-style-type: none"> <li>Body surface finishing</li> </ul>	The following tools, equipment and safety gears are to be available: <ul style="list-style-type: none"> <li>Brushes</li> <li>Spray gun</li> <li>Masks</li> <li>Scrapers</li> <li>Air compressor</li> <li>Air hose</li> <li>Overall</li> </ul>	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	Assessment		
			<p>inspecting the exterior part of the vehicle body</p> <p><b>Demonstration:</b></p> <p>Guide students to formulate groups and demonstrate to them how to perform vehicle's body exterior part inspection</p> <p><b>Practical work:</b></p> <p>Organise the students into manageable groups and guide them to perform inspection of the exterior vehicle body surface</p>	<p>surface to remove dust</p> <ul style="list-style-type: none"> <li>• Observe safety regulation</li> <li>• Clean or wash the tools</li> <li>• Store tools in safe custody</li> </ul>		<ul style="list-style-type: none"> <li>• Body painting preparations</li> <li>• Initial painting treatments</li> </ul> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Describe the structure and properties of different paints</li> <li>• Highlight the application of each emery paper sizes</li> <li>• Explain the importance of surface cleaning before painting</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• Safety precautions to be observed</li> <li>• First aid</li> </ul>	<ul style="list-style-type: none"> <li>• Apron</li> <li>• Gloves</li> <li>• Pliers</li> <li>• Safety boots</li> <li>• Hand gloves</li> </ul>	
		(b) Preparing the panel	<b>Brainstorming:</b>	<b>The student</b>	The prepared panel surface	<b>Knowledge evidence:</b>		

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				Process Assessment	Services Assessment	Assessment		
		surface for painting	<p>Guide the students to explain the painting processes</p> <p><b>Demonstration:</b></p> <p>Guide students to formulate groups and demonstrate to them how to prepare vehicle body panel surface for painting</p> <p><b>Practical work:</b></p> <p>Organise the students into manageable groups and guide them to prepare exterior body surfaces for painting</p>	<p><b>should be able to:</b></p> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Remove dirtiness from the panel surface</li> <li>• Apply sand paper</li> <li>• Clean the surface by washing with clean water</li> <li>• Dry the panel surface clearly</li> <li>• Observe safety regulation</li> <li>• Clean or wash the tools</li> <li>• Store tool in the safe custody</li> </ul>	conforms to technical specifications	<p><b>Detailed knowledge of:</b></p> <p><b>Method used:</b> The student should explain the panel painting procedures</p> <p><b>Principles:</b> The student should state the principles of:</p> <ul style="list-style-type: none"> <li>• Material properties</li> <li>• Paint mixing</li> <li>• Under painting</li> <li>• Painting</li> <li>• Paint curing</li> </ul> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Describe the structure and properties of different paints</li> <li>• Highlight the application of each emery paper sizes</li> <li>• Explain the importance of cleaning before</li> </ul>	<p>The following tools, equipment and safety gears are to be available:</p> <ul style="list-style-type: none"> <li>• Brushes</li> <li>• Sanding machine</li> <li>• Disc grinding machine</li> <li>• Spray gun</li> <li>• Masks</li> <li>• Scrapers</li> <li>• Air compressor</li> <li>• Air hose</li> <li>• Overall</li> <li>• Apron</li> <li>• Gloves</li> <li>• Pliers</li> <li>• Safety boots</li> <li>• Hand gloves</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
						painting <b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Safety precautions to be observed</li> <li>• Environment safety</li> <li>• First aid</li> </ul>		
		(c) Handling brush/spray paint	<b>Brainstorming:</b>  Guide the students to explain painting methods/ techniques  <b>Demonstration:</b>  Guide students to formulate groups and demonstrate to them how to handle brush and spray gun for painting  <b>Practical work:</b>	<b>The students should be able to:</b> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Apply sand paper</li> <li>• Clean the surface to remove dirtiness dust by washing with clean water</li> <li>• Mix painting materials</li> <li>• Apply</li> </ul>	A tools and equipment handled as manufacture's requirements/ specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Method used:</b> The student should explain the panel painting methods  <b>Principles:</b> The student should explain the principles of: <ul style="list-style-type: none"> <li>• Painting</li> <li>• Paint cure</li> </ul> <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>• Define hand paint</li> </ul>	The following tools, equipment and safety gears are to be available: <ul style="list-style-type: none"> <li>• Brushes</li> <li>• Spray gun</li> <li>• Masks</li> <li>• Scrapers</li> <li>• Air compressor</li> <li>• Air hose</li> <li>• Overall</li> <li>• Apron</li> <li>• Gloves</li> <li>• Pliers</li> <li>• Safety boots</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
			Organise the students into manageable groups and guide them how to handle hand brush as well as spray painting gun	undercoat painting by brush or spraying <ul style="list-style-type: none"> <li>• Apply a second coat</li> <li>• Apply the final coat</li> <li>• Cure the painted surface</li> <li>• Clean and Polish the painted surface</li> <li>• Observe safety regulations</li> <li>• Clean or wash the tools</li> <li>• Store the tool in safe custody</li> </ul>		handling <ul style="list-style-type: none"> <li>• Elaborate spray paint handling</li> <li>• Describe paint protection</li> </ul> <b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Safety precautions to be observed</li> <li>• Environment safety</li> <li>• First aid</li> </ul>	<ul style="list-style-type: none"> <li>• Hand gloves</li> </ul>	
	9.2 Carrying out painting on the interior body panel	(a) Inspecting the interior body	<b>Brainstorming:</b>  Guide the students to describe the vehicle's interior body inspection  <b>Simulation:</b>	<b>The students should be able to:</b> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Remove dirt from the panel surface</li> </ul>	The interior body surface conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Method used:</b> The student should explain the panel painting procedures  <b>Principles:</b> The student	The following tools, equipment and safety gears are to be available: <ul style="list-style-type: none"> <li>• Brushes</li> <li>• Spray gun</li> </ul>	16

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				Process Assessment	Services Assessment	Assessment		
			<p>Provide the students with several videos to simulate techniques of inspecting the interior part of the vehicle body</p> <p><b>Demonstration:</b></p> <p>Guide students to formulate groups and demonstrate to them how to perform vehicle's body interior part inspection</p> <p><b>Practical work:</b></p> <p>Organise the students into manageable groups and guide them to perform inspection of the interior vehicle body surface</p>	<ul style="list-style-type: none"> <li>• Apply sand paper to remove rust and old paint</li> <li>• Clean the surface for removing dust</li> <li>• Observe safety regulation</li> <li>• Clean or wash the tools</li> <li>• Store tools in the safe custody</li> </ul>		<p>should explain the principles of:</p> <ul style="list-style-type: none"> <li>• Body surface finishing</li> <li>• Body painting preparations</li> <li>• Initial painting treatments</li> </ul> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Describe the structure and properties of different paints</li> <li>• Highlight the application of each emery paper sizes</li> <li>• Explain the importance of surface cleaning before painting</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p>	<ul style="list-style-type: none"> <li>• Masks</li> <li>• Scrapers</li> <li>• Air compressor</li> <li>• Air hose</li> <li>• Overall</li> <li>• Apron</li> <li>• Gloves</li> <li>• Pliers</li> <li>• Safety boots</li> <li>• Hand gloves</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
						<ul style="list-style-type: none"> <li>Safety precautions to be observed</li> <li>First aid</li> </ul>		
		(b) Preparing the surface for painting	<p><b>Brainstorming:</b></p> <p>Guide the students to explain the painting processes</p> <p><b>Demonstration:</b></p> <p>Guide students to formulate groups and demonstrate to them how to prepare vehicle body panel surface for painting</p> <p><b>Practical work:</b></p> <p>Organise the students into manageable groups and guide them to prepare interior body</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> <li>Remove dirtiness from the panel surface</li> <li>Apply sand paper</li> <li>Clean the surface by washing with clean water</li> <li>Dry the panel surface clearly</li> <li>Observe safety regulation</li> <li>Clean or wash the tools</li> <li>Store tools in the safe</li> </ul>	The prepared surface for painting conforms to technical specifications	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Method used:</b> The student should elaborate the panel painting procedures</p> <p><b>Principles:</b> The student should explain the principles of:</p> <ul style="list-style-type: none"> <li>Material properties</li> <li>Paint mixing</li> <li>Under painting</li> <li>Painting</li> <li>Paint curing</li> </ul> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>Describe the structure and properties of different paints</li> <li>Explain the</li> </ul>	<p>The following tools, equipment and safety gears are be available:</p> <ul style="list-style-type: none"> <li>Brushes</li> <li>Sanding machine</li> <li>Disc grinding machine</li> <li>Spray gun</li> <li>Masks</li> <li>Scrapers</li> <li>Air compressor</li> <li>Air hose</li> <li>Overall</li> <li>Apron</li> <li>Gloves</li> <li>Pliers</li> <li>Safety boots</li> <li>Hand gloves</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
			surfaces for painting	custody		application of each emery paper sizes <ul style="list-style-type: none"> <li>Describe importance of cleaning before painting</li> </ul> <b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>Safety precautions to be observed</li> <li>Environment safety</li> <li>First aid</li> </ul>		
		(c) Handling brush/spray paint	<b>Demonstration:</b> Guide students to formulate groups and demonstrate to them how to handle brush and spray gun for painting  <b>Practical work:</b> Organise the students into	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> <li>Apply sand paper</li> <li>Clean the surface to remove dirtiness dust by washing with clean water</li> <li>Mix painting materials</li> </ul>	Tools and equipment handled as manufacture's requirements/specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Method used:</b> The student should explain the panel painting methods  <b>Principles:</b> The student should describe the principles of: <ul style="list-style-type: none"> <li>Painting</li> </ul>	The following tools, equipment and safety gears are be available: <ul style="list-style-type: none"> <li>Brushes</li> <li>Spray gun</li> <li>Masks</li> <li>Scrapers</li> <li>Air compressor</li> <li>Air hose</li> <li>Overall</li> <li>Apron</li> </ul>	



Module Title (Main Competence)	Unit 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	Assessment		
			manageable groups and guide them on how to handle hand brush as well as spray painting gun for interior vehicle body paint	<ul style="list-style-type: none"> <li>• Apply under coat painting by brush or spraying</li> <li>• Apply second coat</li> <li>• Apply final coat</li> <li>• Cure the painted surface</li> <li>• Observe safety regulation</li> <li>• Clean or wash the tools</li> <li>• Store tools in safe custody</li> </ul>		<ul style="list-style-type: none"> <li>• Paint cure</li> </ul> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Elaborate hand paint handling</li> <li>• Clarify spray paint handling</li> <li>• Describe paint protection</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• Safety precautions to be observed</li> <li>• Environment safety</li> <li>• First aid</li> </ul>	<ul style="list-style-type: none"> <li>• Gloves</li> <li>• Pliers</li> <li>• Safety boots</li> <li>• Hand gloves</li> </ul>	
10 Maintaining emission control system	10.1 Servicing catalytic converter	(a) Inspecting catalytic converter	<b>Brainstorming:</b>  Guide the students to explain emission	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Use service manual</li> <li>• Select tools and</li> </ul>	Catalytic converter inspected as per technical specifications	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should explain</p>	The following tools, equipment and safety gears are to be	28

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Assessment		
			<p>system</p> <p><b>Discussion:</b></p> <p>Guide the students to discuss the importance of catalytic converters in the emission system of the vehicle</p> <p><b>Simulation:</b></p> <p>Provide the students with several videos to simulate how to inspect functionality of the catalytic converter in the emission system</p> <p><b>Practical work:</b></p> <p>Organise the students into manageable</p>	<p>equipment</p> <ul style="list-style-type: none"> <li>• Check catalytic converter</li> <li>• Identify the defect</li> <li>• Clean tools, equipment and work place</li> <li>• Store tools and equipment in the safe place</li> </ul>		<p>how to:</p> <ul style="list-style-type: none"> <li>• Check catalytic converter</li> <li>• Test emission</li> </ul> <p><b>Principles:</b> The student should outline the principles of:</p> <ul style="list-style-type: none"> <li>• Checking how catalytic converter works</li> <li>• Checking catalytic converter for leaks and damage</li> </ul> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Describe the functions of the catalytic converter</li> <li>• Distinguish types of catalytic converter</li> <li>• Elaborate the importance of catalytic converter</li> </ul> <p><b>Circumstantial knowledge</b></p> <p><b>Detailed knowledge</b></p>	<p>available:</p> <ul style="list-style-type: none"> <li>• Service Manual</li> <li>• Tool kit</li> <li>• Pipe cutter</li> <li>• Air compressor</li> <li>• Exhaust gas analyser</li> <li>• Overall</li> <li>• Safety boot</li> <li>• Gloves</li> <li>• Safety clear glasses</li> </ul>	

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				Process Assessment	Services Assessment	Assessment		
			groups and guide them to inspect catalytic converter			<b>about:</b> <ul style="list-style-type: none"> <li>• Safety precautions while inspecting catalytic converter</li> <li>• Handling of tools and equipment</li> <li>• Health safety</li> <li>• Environment safety</li> </ul>		
		(b) Repairing catalytic converter	<b>Simulation:</b> Provide the students with several videos to simulate how to repair the catalytic converter in the emission system  <b>Demonstration:</b> Guide students to formulate groups and demonstrate to them how to repair a faulty catalytic	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Use the service manual</li> <li>• Select tools and equipment</li> <li>• Identify the defects</li> <li>• Repair catalytic converter</li> <li>• Test catalytic converter</li> <li>• Replace catalytic converter</li> <li>• Clean tools, equipment and work place</li> <li>• Store tools and equipment in the right place</li> </ul>	Catalytic converter repaired as per manufacturer's specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain how to: <ul style="list-style-type: none"> <li>• Repair catalytic converter</li> <li>• Test catalytic converter</li> </ul> <b>Principles:</b> The student should explain the principle of: <ul style="list-style-type: none"> <li>• Checking catalytic converter for leaks and damage</li> <li>• Repairing/replace catalytic converter</li> </ul>	The following tools, equipment and safety gears are to be available: <ul style="list-style-type: none"> <li>• Service Manual</li> <li>• Tool kit</li> <li>• Scan tool</li> <li>• Exhaust gas analyser</li> <li>• Pipe cutter</li> <li>• Overall</li> <li>• Safety boot</li> <li>• Safety clear glasses</li> <li>• Gloves</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
			converter  <b>Practical work:</b> Organise the students into manageable groups and guide them to repair a faulty catalytic converter			<ul style="list-style-type: none"> <li>• Testing catalytic converter</li> </ul> <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>• Explain the functions of catalytic converter</li> <li>• Distinguish types of catalytic converter</li> <li>• Explain the importance of catalytic converter</li> </ul> <b>Circumstantial knowledge</b> <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Safety precautions while servicing catalytic converter</li> <li>• Environment safety</li> <li>• Handling of tools and equipment</li> </ul>		
	10.2 Repairing leakage on exhaust pipe/muffl	(a) Repairing exhaust system components	<b>Simulation:</b> Provide the students with several videos to	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Use service manual</li> </ul>	Exhaust system components repaired as per manufacturer's	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The	The following tools, equipment and safety	20

Module Title (Main Competence)	Unit 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	Assessment		
	er		<p>simulate how to repair the exhaust system components</p> <p><b>Discussion:</b></p> <p>Guide the students to discuss the various components of exhaust system and their faults</p> <p><b>Practical work:</b></p> <p>Organise the students into manageable groups and guide them to repair the exhaust pipe and muffler</p>	<ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Check leakages and damage of exhaust system</li> <li>• Repair exhaust damage</li> <li>• Test components of exhaust system</li> <li>• Observe safety regulation</li> <li>• Clean tools, equipment and work place</li> <li>• Store tools and equipment in safe</li> </ul>	service manual	<p>student should explain how to:</p> <ul style="list-style-type: none"> <li>• Use service manual</li> <li>• Select tools and equipment</li> <li>• Repair components</li> <li>• Test exhaust system</li> </ul> <p><b>Principles:</b> The student should explain the principles of:</p> <ul style="list-style-type: none"> <li>• Checking exhaust system</li> <li>• Repair exhaust system components</li> <li>• Testing exhaust system</li> </ul> <p><b>Theories:</b> The student should :</p> <ul style="list-style-type: none"> <li>• Describe the importance of cleaning oxygen sensor</li> <li>• Explain how Test oxygen sensor</li> <li>• Enumerate the functions of oxygen sensor</li> </ul>	<p>gears are be available:</p> <ul style="list-style-type: none"> <li>• Service Manual</li> <li>• Tool kit</li> <li>• Oxy-acetylene gas</li> <li>• Blow pipe</li> <li>• Scan tool</li> <li>• Exhaust gas analyser</li> <li>• Pipe cutter</li> <li>• Overall</li> <li>• Safety boot</li> <li>• Safety clear glasses</li> <li>• Gloves</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
						<ul style="list-style-type: none"> <li>Describe the types of oxygen sensors</li> </ul> <p><b>Circumstantial knowledge</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>Safety precautions while servicing repairing exhaust components</li> <li>Handling of tools and equipment</li> <li>Waste disposal</li> </ul>		
		(b) Replacing exhaust system components	<p><b>Practical work:</b></p> <p>Organise the students into manageable groups and guide them to replace the exhaust pipe and muffler</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>Use the service manual</li> <li>Select tools, equipment, and safety gears</li> <li>Check leakages and damage to exhaust system</li> <li>Replacing exhaust system components</li> <li>Test components</li> </ul>	Exhaust system components replaced as per manufacturer's service manual	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should explain how to:</p> <ul style="list-style-type: none"> <li>Select tools and equipment</li> <li>Check exhaust system components</li> <li>Replace components</li> <li>Test exhaust system</li> </ul>	<p>The following tools, equipment and safety gears are to be available:</p> <ul style="list-style-type: none"> <li>Service Manual</li> <li>Tool kit</li> <li>Scan tool</li> <li>Exhaust gas analyser</li> <li>Pipe cutter</li> <li>Overall</li> <li>Safety boot</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
				of exhaust system <ul style="list-style-type: none"> <li>• Observe safety regulations</li> <li>• Clean tools, equipment, and work place</li> <li>• Store tools and equipment</li> </ul>		<p><b>Principles:</b> The student should explain the principles of:</p> <ul style="list-style-type: none"> <li>• Checking exhaust system</li> <li>• Repair exhaust system components</li> <li>• Testing exhaust system</li> </ul> <p><b>Theories:</b> The student should: -</p> <ul style="list-style-type: none"> <li>• Explain the importance of cleaning the oxygen sensor</li> <li>• Describe Testing the oxygen sensor</li> <li>• Explain the functions of the oxygen sensor</li> <li>• Describe types of oxygen sensors</li> </ul> <p><b>Circumstantial knowledge</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• Safety precautions while servicing and</li> </ul>	<ul style="list-style-type: none"> <li>• Safety clear glasses</li> <li>• Gloves</li> </ul>	

Module Title (Main Competence)	Unit 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	Assessment		
						repairing exhaust components • Handling of tools and equipment • Waste disposal		



## 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 Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
1 Performing spray painting on vehicle body or panels	1.1 Carrying out spray painting on vehicle body	(a) Inspecting the surface	<p><b>Brainstorming:</b> Guide the students to explain body panel surface inspection</p> <p><b>Demonstration:</b>  Guide students to formulate groups and demonstrate to inspect the prepared surface for painting</p> <p><b>Practical work:</b> Organise the students into manageable groups and guide them to inspect the body panel surface for painting</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>• Select tools, equipment, and safety gears</li> <li>• Inspect the straightened surface</li> <li>• Check and identify the areas that need filling body filler or soft putty</li> <li>• Observe safety</li> <li>• Clean the tools</li> <li>• Store tools in safe custody</li> </ul>	Surface inspected as per requirement	<p><b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Method used:</b> The student should explain the spray paint techniques <b>Principles:</b> The student should explain the principles of:</p> <ul style="list-style-type: none"> <li>• Surface preparation</li> </ul> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Describe the preparation of the surface</li> <li>• Explain paint-removing techniques</li> <li>• Describe types of abrasives materials</li> <li>• Explain soft putting the surface</li> </ul>	<p>The following tools, safety gears and equipment are to be available:</p> <ul style="list-style-type: none"> <li>• Air compressor</li> <li>• Air pipes</li> <li>• Spray gun</li> <li>• Nose mask</li> <li>• Apron</li> <li>• Overall</li> <li>• Head shield with respirators</li> <li>• Scrapers</li> <li>• Hand gloves</li> <li>• Industrial boots</li> <li>• Scraper</li> <li>• Wire brush</li> <li>• Painting room/workshop</li> </ul>	25

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						<b>Circumstantial knowledge:</b> <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Safety precautions to be observed while spray painting</li> <li>• First aid</li> <li>• Environmental effects</li> </ul>		
		(b) Performing Primer painting	<b>Brainstorming:</b> Guide the students to explain the primer painting <b>Demonstration:</b> Guide students to formulate groups and demonstrate how to perform primer painting on body surface <b>Practical work:</b> Organise the	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Sand down the surface with water-sanding paper</li> <li>• Dry the smooth surface</li> <li>• Cover the areas which are not painted</li> <li>• Apply primer</li> </ul>	Primer painted conforms to technical specifications	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Method used:</b> The student should describe the primer paint technique used <b>Principles:</b> The student should explain the principles of: <ul style="list-style-type: none"> <li>• Surface preparation</li> <li>• Primer painting</li> </ul> <b>Theories:</b> The	The following tools, safety gears and equipment are to be available: <ul style="list-style-type: none"> <li>• Air compressor</li> <li>• Air pipes</li> <li>• Spray gun</li> <li>• Nose mask</li> <li>• Apron</li> <li>• Overall</li> <li>• Head shield with respirators</li> <li>• Scrapers</li> <li>• Hand gloves</li> <li>• Industrial boots</li> <li>• Scraper</li> <li>• Wire brush</li> <li>• Painting room/workshop</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			students into manageable groups and guide them to perform body panel primer painting	paint <ul style="list-style-type: none"> <li>• Observe safety</li> <li>• Clean the tools,</li> <li>• Store tools in safe custody</li> </ul>		student should: <ul style="list-style-type: none"> <li>• Explain the preparation of the surface</li> <li>• Elaborate different paint mixing</li> <li>• Define spray painting</li> <li>• Describe types of abrasive materials</li> <li>• Define the concept of soft-putting the surface</li> </ul> <b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Safety precautions to be observed while spray painting</li> <li>• First aid</li> <li>• Environmental effects</li> </ul>	<ul style="list-style-type: none"> <li>• Water bath</li> </ul>	
		(c) Applying the first coat	<b>Demonstration:</b>  Guide students to formulate groups and demonstrate	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Select tools,</li> </ul>	First coat paint painted conforms to technical	<b>Knowledge evidence:</b>  <b>Detailed knowledge</b>	The following tools, safety gears and equipment are to be available:	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>to them how to apply the first coat on the vehicle body surface</p> <p><b>Practical work:</b></p> <p>Organise the students into manageable groups and guide them to apply body panel first coat painting</p>	<p>equipment and safety gears</p> <ul style="list-style-type: none"> <li>• Sand down the surface with fine water sanding paper</li> <li>• Wash the surface with clean water</li> <li>• Dry smooth washed surface</li> <li>• Cover the areas which are not painted</li> <li>• Spray the 1st coating</li> <li>• Switch off the compressors</li> <li>• Observe safety</li> <li>• Clean the tools</li> <li>• Store tools in safe custody</li> </ul>	specifications	<p><b>of:</b></p> <p><b>Method used:</b> The student should describe the first coat paint techniques used</p> <p><b>Principles:</b> The student should explain the principles of:</p> <ul style="list-style-type: none"> <li>• Spray painting</li> </ul> <p><b>Theories:</b> The student should :</p> <ul style="list-style-type: none"> <li>• Explain the concept of spray first painting</li> <li>• Highlight the meaning of preparation of the first paint</li> <li>• Define Spray pressure setting</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• Safety precautions</li> </ul>	<ul style="list-style-type: none"> <li>• Air compressor</li> <li>• Air pipes</li> <li>• Spray gun</li> <li>• Nose mask</li> <li>• Apron</li> <li>• Overall</li> <li>• Head shield with respirators</li> <li>• Scrapers</li> <li>• Hand gloves</li> <li>• Industrial boots</li> <li>• Scraper</li> <li>• Wire brush</li> <li>• Painting room/workshop</li> <li>Water bath</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						to be observed while spray painting <ul style="list-style-type: none"> <li>• First aid</li> <li>• Environmental effects</li> </ul>		
		(d) Applying final coat	<b>Brainstorming:</b> Guide the students to explain final coat painting  <b>Demonstration:</b> Guide students to formulate groups and demonstrate to them how to apply the final coat on the vehicle body surface  <b>Practical work:</b> Organise the students into	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Sand down the surface with fine water sanding paper</li> <li>• Wash the surface with clean water</li> <li>• Dry smooth washed surface</li> <li>• Cover the areas which are not painted</li> <li>• Dry wash the surface</li> </ul>	Final paint painted conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Method used:</b> The student should explain the spray paint technique used  <b>Principles:</b> The student should describe the principles of: <ul style="list-style-type: none"> <li>• Finish spraying</li> <li>• Spray painting</li> </ul> <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>• Describe spray painting</li> <li>• Outline the types of spray paint</li> </ul>	The following tools, safety gears and equipment are to be available: <ul style="list-style-type: none"> <li>• Air compressor</li> <li>• Air pipes</li> <li>• Spray gun</li> <li>• Nose mask</li> <li>• Apron</li> <li>• Overall</li> <li>• Head shield with respirators</li> <li>• Scrapers</li> <li>• Hand gloves</li> <li>• Industrial boots</li> <li>• Scraper</li> <li>• Wire brush</li> <li>• Painting room/workshop</li> <li>• Water bath</li> <li>• Polishing machine</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			manageable groups and guide them to apply body panel final coat painting	<ul style="list-style-type: none"> <li>• Spray the final coats</li> <li>• Switch off compressors</li> <li>• Remove covering paper</li> <li>• Clean the body surface and polish the surface</li> <li>• Observe safety</li> <li>• Clean the tools</li> <li>• Store tools and equipment in safe custody</li> </ul>		<ul style="list-style-type: none"> <li>• Highlight the meaning of soft putting the surface</li> <li>• Explain how to adjust spray pressure</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• Safety precautions to be observed while spray painting</li> <li>• First aid</li> <li>• Environmental effects</li> </ul>		
	1.2 Carrying out metallic spray painting on vehicle body	(a) Performing paint mixing	<p><b>Brainstorming:</b></p> <p>Guide the students to explain the metallic painting</p> <p><b>Practical work:</b></p> <p>Organise the students into manageable</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Sand down the surface with fine water sanding</li> </ul>	Paint mixed conforms to technical specifications	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Method used:</b> The student should explain the metallic paint spray techniques</p>	The following tools, safety gears and equipment are to be available: <ul style="list-style-type: none"> <li>• Air compressor</li> <li>• Air pipes</li> <li>• Spray gun</li> <li>• Color mixer machine</li> <li>• Nose mask</li> <li>• Apron</li> <li>• Overall</li> </ul>	28

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			groups and guide them to mix painting	paper <ul style="list-style-type: none"> <li>• Wash the surface with clean water</li> <li>• Dry smooth washed surface</li> <li>• Cover the areas which are not painted</li> <li>• Apply primer paint</li> </ul>		<b>Principles:</b> The student should describe the principles of: <ul style="list-style-type: none"> <li>• Spray painting</li> <li>• Paint mixing</li> <li>• Metallic painting</li> </ul> <b>Theories:</b> The student should explain: <ul style="list-style-type: none"> <li>• Spray painting technique</li> <li>• Different paint colour mixing</li> </ul> <b>Circumstantial knowledge</b> <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Safety precautions to be observed while spray painting</li> <li>• First aid</li> <li>• Environmental</li> </ul>	<ul style="list-style-type: none"> <li>• Head shield with respirators</li> <li>• Scrapers</li> <li>• Hand gloves</li> <li>• Industrial boots</li> <li>• Scraper</li> <li>• Wire brush</li> <li>• Painting room/workshop</li> <li>• Water bath</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						effects		
		(b) Applying paint on auto-body	<p><b>Demonstration:</b></p> <p>Guide students to formulate groups and demonstrate to them how to apply the metallic paint on the vehicle body surface</p> <p><b>Practical work:</b></p> <p>Organise the students into manageable groups and guide them to perform metallic painting</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Sand down the surface with fine water sanding paper</li> <li>• Wash the surface with clean water</li> <li>• Dry smooth washed surface</li> <li>• Cover the areas which are not painted</li> <li>• Dry wash the surface</li> <li>• Spray the final coats</li> <li>• Switch off compressors</li> <li>• Remove</li> </ul>	Metallic paint sprayed conforms to technical specifications	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Method used:</b> The student should explain the metallic paint spray techniques</p> <p><b>Principles:</b> The student should explain the principles of:</p> <ul style="list-style-type: none"> <li>• Metallic paint spraying</li> </ul> <p><b>Theories:</b> The student should :</p> <ul style="list-style-type: none"> <li>• Describe different paint colour mixing</li> <li>• Present spray pressure setting</li> <li>• Describe metallic spray-painting techniques</li> </ul>	<p>The following tools, safety gears and equipment are to be available:</p> <ul style="list-style-type: none"> <li>• Air compressor</li> <li>• Air pipes</li> <li>• Spray gun</li> <li>• Colour mixer machine</li> <li>• Nose mask</li> <li>• Apron/Overall</li> <li>• Head shield with respirators</li> <li>• Scrapers</li> <li>• Hand gloves</li> <li>• Industrial boots</li> <li>• Scraper</li> <li>• Painting room/workshop</li> <li>• Water bath</li> <li>• Polishing machine</li> </ul>	



Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
				covering paper <ul style="list-style-type: none"> <li>• Clean the body surface and polish the surface</li> <li>• Observe safety</li> <li>• Clean the tools</li> <li>• Store tools and equipment in safe custody</li> </ul>		<b>Circumstantial knowledge</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Safety precautions to be observed while spray painting</li> <li>• Environmental effects</li> </ul>		
2 Performing arc welding on various vehicle body parts	2.1 Carrying out arc welding on non-ferrous metals	(a) Performing arc welding on aluminium material parts	<b>Brainstorming:</b>  Guide the students to explain arc welding on non-ferrous metals  <b>Demonstration:</b>  Guide students to formulate groups and demonstrate to them how to weld the alluminium materials on	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Inspect the machine, cable and welding holder</li> <li>• Interpret working drawing</li> <li>• Prepare materials for</li> </ul>	Welded thick aluminium plate conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain <ul style="list-style-type: none"> <li>• Resistance welding technique used</li> <li>• Welding procedure</li> </ul> <b>Principles:</b> The student should explain the principles of: <ul style="list-style-type: none"> <li>• Welding thick</li> </ul>	The following tools, safety gears and equipment are to be available: <ul style="list-style-type: none"> <li>• Welding machine (TIG, MIG)</li> <li>• Welding cables</li> <li>• Earth clamps</li> <li>• Welding shield</li> <li>• Chipping hammer</li> <li>• Wire brush</li> <li>• Work bench</li> <li>• Tongs</li> <li>• Angle grinder</li> <li>• Bench vice</li> </ul>	120

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			vehicle body  <b>Practical activity:</b>  Organise the students into manageable groups and guide them to perform arc welding on aluminium materials	welding • Select types and sizes of consumable wires • Align and tack the workpiece • Maintain Angle and arc length • Control travel speed along the joint • Clean workplace, tools and equipment • Store tools and equipment safely		materials • Heat treatment • Purging <b>Theories:</b> The student should:  • Describe properties of non-ferrous materials • State metallurgy of materials • Explain heat treatment processes • Outline welding polarities and application • Describe weld defects • Interpret technical drawing skills  <b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b>  • Safety precautions to be observed while welding thick plates • First Aid	• Scriber	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
		(b) Performing arc welding on copper material parts	<p><b>Demonstration:</b></p> <p>Guide students to formulate groups and demonstrate to them how to weld copper materials of the vehicle body</p> <p><b>Practical work:</b></p> <p>Organise the students into manageable groups and guide them to perform arc welding on copper materials</p>	<p><b>The students should be able to:</b></p> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Inspect the machine, cable and welding holder</li> <li>• Interpret working drawing</li> <li>• Prepare materials for welding</li> <li>• Select types and sizes of consumable wires</li> <li>• Align and tack the workpiece</li> <li>• Maintain Angle and arc length</li> </ul>	Welded thick copper plate conforms to technical specifications	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b></p> <p>The student should explain</p> <ul style="list-style-type: none"> <li>• Resistance welding technique used</li> <li>• Welding procedure</li> </ul> <p><b>Principles:</b></p> <p>The student should explain the principles of:</p> <ul style="list-style-type: none"> <li>• Welding thick copper materials</li> <li>• Heat treatment</li> <li>• Purging</li> </ul> <p><b>Theories:</b></p> <p>The student should:</p>	<p>The following tools, safety gears and equipment are to be available:</p> <ul style="list-style-type: none"> <li>• Welding machine (TIG, MIG)</li> <li>• Welding cables</li> <li>• Earth clamps</li> <li>• Welding shield</li> <li>• Chipping hammer</li> <li>• Wire brush</li> <li>• Work bench</li> <li>• Tongs</li> <li>• Angle grinder</li> <li>• Bench vice</li> <li>• Scriber</li> </ul>	

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				<ul style="list-style-type: none"> <li>• Control travel speed along the joint</li> <li>• Clean workplace, tools and equipment</li> <li>• Store tools and equipment safely</li> </ul>		<ul style="list-style-type: none"> <li>• Describe the properties of non-ferrous materials</li> <li>• Metallurgy of materials</li> <li>• Explain heat treatment processes</li> <li>• Elaborate welding polarities and application</li> <li>• Identify Welding defects</li> <li>• Interpret technical drawing skills</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• Safety precautions to be observed while welding thick plates</li> <li>• First Aid</li> </ul>		
	2.2 Carrying out welding on	(a) Performing MIG	<b>Demonstration:</b> Guide students to	<b>The students should be able</b>	Welded mild steel	<b>Knowledge evidence:</b>	The following tools, safety gears	140

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	plates using MIG and TIG welding	welding on mild steel plates	<p>formulate groups and demonstrate to them how to perform MIG welding techniques</p> <p><b>Practical work:</b></p> <p>Organise the students into manageable groups and guide them to perform MIG welding on mild steel plate</p>	<p><b>to:</b></p> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Inspect MIG welding equipment and accessories</li> <li>• Select correct filler metal</li> <li>• Align and tack weld the workpiece</li> <li>• Maintain work and lead angle</li> <li>• Maintain uniform travel speed along the joint</li> <li>• Control distortion</li> <li>• Clean tools and equipment and store them safely</li> </ul>	workpiece conforms to technical specifications	<p><b>Detailed knowledge of:</b></p> <p><b>Method used:</b> The student should explain different welding techniques</p> <p><b>Principles:</b> The student should state the principles of:</p> <ul style="list-style-type: none"> <li>• MIG welding</li> <li>• Purging</li> </ul> <p><b>Theories:</b> The student should d:</p> <ul style="list-style-type: none"> <li>• Describe different types of tungsten electrodes</li> <li>• Explain different MIG welding techniques</li> <li>• Describe type of materials for MIG welding</li> </ul> <p><b>Circumstantial knowledge:</b></p>	<p>and equipment are to be available:</p> <ul style="list-style-type: none"> <li>• Welding machine (MIG)</li> <li>• Welding cables</li> <li>• Earth clamps</li> <li>• Welding shield</li> <li>• Chipping hammer</li> <li>• Wire brush</li> <li>• Work bench</li> <li>• Tongs</li> <li>• Angle grinder</li> <li>• Bench vice</li> <li>• Scriber</li> </ul>	

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						<b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>Safety precautions to be observed while performing MIG welding</li> </ul>		
		(b) Performing TIG welding on copper plates	<b>Demonstration:</b> Guide students to formulate groups and demonstrate to them how to perform the TIG welding technique on non-ferrous materials  <b>Practical work:</b> Organise the students into manageable groups and guide them to perform TIG welding on copper plate	<b>The students should be able to:</b> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> <li>Inspect TIG and MIG welding equipment and accessories</li> <li>Select the correct filler metal</li> <li>Align and tack weld the workpiece</li> <li>Maintain work and lead angle</li> <li>Maintain</li> </ul>	Welded copper workpiece conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Method used:</b> The student should explain different welding techniques  <b>Principles:</b> The student should explain the principles of: <ul style="list-style-type: none"> <li>TIG welding</li> <li>Purging</li> </ul> <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>Distinguish</li> </ul>	The following tools, safety gears and equipment are to be available: <ul style="list-style-type: none"> <li>Welding machine (TIG)</li> <li>Welding cables</li> <li>Earth clamps</li> <li>Welding shield</li> <li>Chipping hammer</li> <li>Wire brush</li> <li>Workbench</li> <li>Tongs</li> <li>Angle grinder</li> <li>Bench vice</li> <li>Scriber</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
				uniform travel speed along the joint • Control distortion • Clean tools and equipment and store them safely		different types of tungsten electrodes • Distinguish different TIG welding techniques • Identify types of materials for TIG welding <b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b>  • Safety precautions to be observed • Workshop rules and regulation • First Aid		
		(c) Performing TIG welding on aluminium plates	<b>Demonstration:</b>  Guide students to formulate groups and demonstrate to them how to perform TIG welding on aluminium plates  <b>Practical work:</b>	<b>The student should be able to:</b> • Select tools, equipment and safety gears • Inspect TIG and MIG welding equipment and	Welded aluminium workpiece conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Method used:</b> The student should explain different welding techniques  <b>Principles:</b> The	The following tools, safety gears and equipment are to be available:  • Welding machine (TIG) • Welding cables • Earth clamps • Welding shield • Chipping	

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			Organise the students into manageable groups and guide them to perform TIG welding on aluminium plate	accessories <ul style="list-style-type: none"> <li>• Select the correct filler metal</li> <li>• Align and tack weld the workpiece</li> <li>• Maintain work and lead angle</li> <li>• Maintain uniform travel speed along the joint</li> <li>• Control distortion</li> <li>• Clean tools and equipment and store them safely</li> </ul>		student should outline the principles of: <ul style="list-style-type: none"> <li>• TIG welding</li> <li>• Purging</li> </ul> <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>• Distinguish different types of tungsten electrodes</li> <li>• Elaborate different TIG welding techniques</li> <li>• Identify types of materials for TIG welding</li> </ul> <b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Safety precautions to be observed</li> <li>• Workshop rules and regulation First Aid</li> </ul>	hammer <ul style="list-style-type: none"> <li>• Wire brush</li> <li>• Work bench</li> <li>• Tongs</li> <li>• Angle grinder</li> <li>• Bench vice</li> <li>• Scriber</li> </ul>	
3 Performing gas welding on vehicle	3.1 carrying out gas welding on ferrous	(a) Performing gas welding	<b>Brainstorming:</b> Guide the students to explain gas	<b>The students should be able</b>	Ferrous metal welded by gas conforms to	<b>Knowledge evidence:</b>	The following tools, safety gears	64



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body brackets	and non-ferrous metals	on ferrous metals	<p>welding on ferrous and non-ferrous metals</p> <p><b>Discussion:</b></p> <p>Guide the students to discuss the difference on how to perform gas welding of ferrous and non-ferrous metals</p> <p><b>Demonstration:</b></p> <p>Guide students to formulate groups and demonstrate to them how to perform gas welding on ferrous metals</p> <p><b>Practical work:</b></p> <p>Organise the students into manageable groups and guide them to perform gas welding on ferrous</p>	<p><b>to:</b></p> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Inspect gas welding equipment</li> <li>• Assemble and disassemble gas cylinders</li> <li>• Select nozzle sizes</li> <li>• Select welding filler wires</li> <li>• Set working pressure</li> <li>• Align and tack weld the workpiece</li> <li>• Check root penetration</li> <li>• Inspect the quality of weld ripples</li> <li>• Clean workplace, tools and equipment</li> <li>• Store tools</li> </ul>	technical specifications	<p><b>Detailed knowledge of:</b></p> <p><b>Method used:</b> The student should explain the gas welding technique used</p> <p><b>Principles:</b> The student should explain the principles of:</p> <ul style="list-style-type: none"> <li>• Welding by gas flame</li> <li>• Low-pressure blow pipe</li> <li>• High-pressure blow pipe</li> </ul> <p><b>Theories:</b></p> <p>The student should:</p> <ul style="list-style-type: none"> <li>• Describe the main parts of the oxy-acetylene plant and their functions</li> <li>• Explain different gas welding techniques</li> <li>• Describe types of flames</li> <li>• Explain the storage</li> </ul>	<p>and equipment are to be available:</p> <ul style="list-style-type: none"> <li>• Oxy-acetylene plant</li> <li>• Pressure regulator</li> <li>• Welding torch</li> <li>• Hose pipe</li> <li>• Gas trolley</li> <li>• Cylinder key</li> <li>• Blow pipe spanner</li> <li>• Spark lighter</li> <li>• Hammer</li> <li>• Chisel</li> <li>• Wire brush</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
				and equipment safely		of gas cylinders <ul style="list-style-type: none"> <li>• State metallurgy of metals (basic)</li> <li>• Elaborate heat and temperature related to welding</li> </ul> <b>Circumstantial knowledge:</b> <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• OSHA rules and regulations</li> <li>• Workshop rules and regulations</li> <li>• Safe working practices</li> <li>• Waste disposal procedures</li> </ul>		
		(b) Performing gas welding on non-ferrous metals	<b>Demonstration:</b> Guide students to formulate groups and demonstrate to them how to perform gas	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Inspect gas</li> </ul>	Non-ferrous metal welded by gas conforms to technical specifications	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Method used:</b> The student should explain the gas welding technique	The following tools, safety gears and equipment are to be available: <ul style="list-style-type: none"> <li>• Oxy-acetylene plant</li> <li>• Pressure regulator</li> </ul>	

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			welding on non-ferrous metals  <b>Practical work:</b> Organise the students into manageable groups and guide them to perform gas welding on non-ferrous	welding equipment • Assemble and disassemble gas cylinders • Select nozzle sizes • Select welding filler wires • Set working pressure • Align and tack weld the workpiece • Check root penetration • Inspect the quality of weld ripples • Clean workplace, tools and equipment • Store tools and equipment safely		used  <b>Principles:</b> The student should explain the principles of: • Welding by gas flame • Low pressure blow pipe • High pressure blow pipe  <b>Theories:</b> The student should : • Describe main parts of oxy-acetylene plant and their functions • Elaborate different gas welding techniques • Distinguish types of flames • Explain storage of gas cylinders • State metallurgy of metals (basic) • Describe heat and temperature related to welding	• Welding torch • Hose pipe • Gas trolley • Cylinder key • Blow pipe spanner • Spark lighter • Hammer • Chisel • Wire brush	

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				Process Assessment	Services Assessment	Knowledge Assessment		
						<b>Circumstantial knowledge:</b> <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• OSHA rules and regulations</li> <li>• Workshop rules and regulations</li> <li>• Safe working practices</li> <li>• Waste disposal procedures</li> </ul>		
		(c) Performing gas welding of copper and its alloys	<b>Brainstorming:</b> Guide the students to explain gas welding on copper and its alloys  <b>Simulation:</b> Provide the students with several videos to simulate the gas welding of copper material and its alloys  <b>Practical work:</b> Organise the	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Inspect gas welding equipment</li> <li>• Assemble and disassemble gas cylinders</li> <li>• Select nozzle sizes</li> <li>• Select welding filler wires</li> </ul>	Welded copper and its alloys by gas conform to technical specifications	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Method used:</b> The student should explain the gas welding technique used  <b>Principles:</b> The student should explain the principles of: <ul style="list-style-type: none"> <li>• Welding by gas flame</li> <li>• Low pressure blow pipe</li> </ul>	The following tools, safety gears and equipment are to be available: <ul style="list-style-type: none"> <li>• Oxy-acetylene plant</li> <li>• Pressure regulator</li> <li>• Welding torch</li> <li>• Hose pipe</li> <li>• Gas trolley</li> <li>• Cylinder key</li> <li>• Blow pipe spanner</li> <li>• Spark lighter</li> <li>• Hammer</li> <li>• Chisel</li> </ul>	

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			students into manageable groups and guide them to perform gas welding on copper and its alloys	<ul style="list-style-type: none"> <li>• Set working pressure</li> <li>• Align and tack weld the workpiece</li> <li>• Check root penetration</li> <li>• Inspect quality of weld ripples</li> <li>• Clean work place, tools and equipment</li> <li>• Store tools and equipment safely</li> </ul>		<ul style="list-style-type: none"> <li>• High pressure blow pipe</li> </ul> <p><b>Theories:</b> The student should :</p> <ul style="list-style-type: none"> <li>• Describe the main parts of oxy-acetylene plant and their functions</li> <li>• Elaborate different gas welding techniques</li> <li>• Distinguish different types of flames</li> <li>• Describe storage of gas cylinders</li> <li>• State the metallurgy of metals (basic)</li> <li>• Describe heat and temperature related to welding</li> </ul> <p><b>Circumstantial knowledge:</b> <b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• OSHA rules and regulations</li> </ul>	<ul style="list-style-type: none"> <li>• Wire brush</li> </ul>	

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						<ul style="list-style-type: none"> <li>Workshop rules and regulations</li> <li>Safe working practices</li> <li>Waste disposal procedures</li> </ul>		
	3.2 Carrying out gas cutting on ferrous metals	(a) Cutting steel plate by automatic machine flame	<p><b>Brainstorming:</b> Guide the students to explain gas cutting on ferrous metal by automatic machines</p> <p><b>Simulation:</b> Provide the students with several videos to show how automatic machines used to cut ferrous metals</p> <p><b>Practical work:</b> Organise the students into manageable groups and guide</p>	<p><b>The students should be able to:</b></p> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> <li>Inspect gas welding equipment</li> <li>Assemble and disassemble gas cylinders</li> <li>Select nozzle sizes</li> <li>Select welding filler wires</li> <li>Set working pressure</li> <li>Align and tack weld the workpiece</li> <li>Check root penetration</li> </ul>	A workpiece cut by automatic machine flame conforms to technical specifications	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Method used:</b> The student should explain gas weld cutting procedures</p> <p><b>Principles:</b> The student should explain the principles of:</p> <ul style="list-style-type: none"> <li>Operating automatic flame cutting machine</li> <li>Cutting metal by flame</li> <li>Smooth cutting</li> <li>Flame setting for cutting</li> </ul> <p><b>Theories:</b> The</p>	<p>The following tools, safety gears and equipment are to be available:</p> <ul style="list-style-type: none"> <li>Oxy-acetylene plant</li> <li>Pressure regulator</li> <li>Welding torch</li> <li>Cutting torch</li> <li>Tongs</li> <li>Hose pipe</li> <li>Gas trolley</li> <li>Cylinder key</li> <li>Blow pipe spanner</li> <li>Spark lighter</li> <li>Hammer</li> <li>Chisel</li> <li>Wire brush</li> </ul>	64

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			them to cut metal by gas using an automatic flame-cutting machine	<ul style="list-style-type: none"> <li>Inspect the quality of weld ripples</li> <li>Clean workplace, tools and equipment</li> <li>Store tools and equipment safely</li> </ul>		<p>student should:</p> <ul style="list-style-type: none"> <li>Describe parts of automatic flame cutting machine</li> <li>Describe their functions</li> <li>Suggest recommended work flames and pressure</li> <li>Elaborate different cutting procedures</li> </ul> <p><b>Circumstantial knowledge:</b> <b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>OSHA rules and regulations</li> <li>Workshop rules and regulations</li> <li>Safe working practices</li> <li>Waste disposal procedures</li> </ul>		
		(b) Cutting steel plate by stack cutting	<p><b>Practical work:</b></p> <p>Organise the students into manageable groups and guide</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>Select tools, equipment</li> </ul>	A stack of steel plate cut conforms to technical specifications	<p><b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Method used:</b> The</p>	<p>The following tools, safety gears and equipment are to be available:</p> <ul style="list-style-type: none"> <li>Oxy-acetylene</li> </ul>	

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			them to cut multiple numbers of plates using an automatic flame-cutting machine	and safety gears <ul style="list-style-type: none"> <li>• Inspect gas welding equipment</li> <li>• Assemble and disassemble gas cylinders</li> <li>• Select nozzle sizes</li> <li>• Select welding filler wires</li> <li>• Set working pressure</li> <li>• Align and tack weld the workpiece</li> <li>• Check root penetration</li> <li>• Inspect quality of weld ripples</li> <li>• Clean work place, tools and equipment</li> <li>• Store tools and equipment safely</li> </ul>		student should explain gas weld cutting procedures <b>Principles:</b> The student should explain the principles of: <ul style="list-style-type: none"> <li>• Operating automatic flame cutting machine</li> <li>• Cutting metal by flame</li> <li>• Smooth cutting</li> <li>• Flame setting for cutting</li> </ul> <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>• Describe parts of automatic flame cutting machine</li> <li>• Describe their functions</li> <li>• Suggest recommended work flames and pressure</li> <li>• Explain different cutting procedures</li> </ul>	plant <ul style="list-style-type: none"> <li>• Pressure regulator</li> <li>• Welding torch</li> <li>• Cutting torch</li> <li>• Tongs</li> <li>• Hose pipe</li> <li>• Gas trolley</li> <li>• Cylinder key</li> <li>• Blow pipe spanner</li> <li>• Spark lighter</li> <li>• Hammer</li> <li>• Chisel</li> <li>• Wire brush</li> </ul>	



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				•		<b>Circumstantial knowledge:</b> <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• OSHA rules and regulations</li> <li>• Workshop rules and regulations</li> <li>• Safe working practices</li> <li>• Waste disposal procedures</li> </ul>		
4 Managing a safe work environment	4.1 Managing hazards	(a) Controlling mechanical hazards	<b>Discussion:</b> Guide students in groups to describe the concepts related to safe work environment and hazards <b>Demonstration:</b> Guide student to demonstrate how to control mechanical hazards <b>Activity:</b> Organize the students in manageable group	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Interpret service manuals</li> <li>• Select tools and equipment</li> <li>• Use OSHA rules and regulations</li> <li>• Prepare workshop inspection report</li> </ul>	Mechanical hazards, risks, incident and accidents are controlled according to OSHA's rules and regulations	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The student should explain how to: <ul style="list-style-type: none"> <li>• Interpret OSHA rules and regulations</li> <li>• Use safety gears</li> <li>• Prepare preventive maintenance schedule and inspection report</li> </ul>	The following tools, safety gears and equipment are to be available: <ul style="list-style-type: none"> <li>• Electrical equipment</li> <li>• Mechanical equipment</li> <li>• Power machines</li> <li>• Measuring tools</li> <li>• Cutting tools</li> <li>• First aid kit</li> <li>• Fire extinguishers</li> <li>• Service</li> </ul>	56

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			to apply methods and techniques of controlling mechanical hazards in school workshop or premises	<ul style="list-style-type: none"> <li>• Prepare workshop colour code and safety signs</li> <li>• Identify any hazardous materials</li> <li>• Handle hazards material</li> <li>• Prepare preventive maintenance schedule</li> <li>• Identify and apply all emergency equipment and supplies</li> <li>• Conduct safety awareness training to sub-ordinates</li> <li>• Monitor safety environment</li> <li>• Manage uses of safety gears</li> <li>• Cleaning tools</li> </ul>		<ul style="list-style-type: none"> <li>• Prepare warning signs and safety instructions</li> <li>• Conduct assessment</li> <li>• Carry out accident investigation</li> <li>• Monitor safe working environment</li> <li>• Manage uses of safety gears</li> </ul> <p><b>Principles:</b> The student should state the principles of:</p> <ul style="list-style-type: none"> <li>• Preparing inspection check lists</li> <li>• Preparing warning signs and safety instructions</li> <li>• Identifying hazardous materials</li> <li>• Preparing and conducting training</li> <li>• Handling hazardous materials</li> </ul>	manuals <ul style="list-style-type: none"> <li>• OSHA rules and regulations</li> <li>• Helmet</li> <li>• Gloves</li> <li>• Ear plug</li> <li>• Mask</li> <li>• Gloves</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
				and equipment • Storing tools and equipment		<p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Explain the function of the inspection checklist</li> <li>• Elaborate on the importance of posting warning sign and safety instructions</li> <li>• Explain advantages of risk assessment</li> <li>• Explain the importance of carry out accident investigation</li> <li>• Highlight the importance of monitoring safety at working place</li> </ul> <p><b>Circumstantial knowledge</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• Safety precautions while managing</li> </ul>		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						hazards <ul style="list-style-type: none"> <li>• Safe handling of tools and equipment</li> <li>• Waste disposal</li> </ul>		
		(b) Controlling chemical hazards	<b>Think-ink-pair-share:</b> Guide students through think-ink-pair-share to define, identify methods and techniques of controlling chemical hazards  <b>Practical work:</b> Guide student on how to control chemical hazards  <b>Activity:</b> Organize the students in manageable group to apply methods and techniques of controlling chemical hazards in school	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Interpret service manuals</li> <li>• Select tools and equipment</li> <li>• Use OSHA rules and regulations</li> <li>• Prepare workshop inspection report</li> <li>• Prepare workshop colour code and safety signs</li> <li>• Identify any safety hazardous</li> </ul>	Chemical hazards, risks, incident and accidents are managed according to OSHA's rules and regulations	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain how to: <ul style="list-style-type: none"> <li>• Interpret OSHA rules and regulations</li> <li>• Use safety gears</li> <li>• Prepare preventive maintenance schedule and inspection report</li> <li>• Prepare warning signs and safety instructions</li> <li>• Conduct assessment</li> <li>• Carry out accident investigation</li> <li>•</li> </ul>	The following tools, safety gears and equipment are to be available: <ul style="list-style-type: none"> <li>• Electrical equipment</li> <li>• Mechanical equipment</li> <li>• Power machines</li> <li>• Measuring tools</li> <li>• Cutting tools</li> <li>• First aid kit</li> <li>• Fire extinguishers</li> <li>• Service manuals</li> <li>• OSHA rules and regulations</li> <li>• Helmet</li> <li>• Gloves</li> <li>• Ear plug</li> <li>• Mask</li> <li>• Gloves</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			workshop or premises	materials <ul style="list-style-type: none"> <li>• Handle hazardous materials</li> <li>• Prepare a preventive maintenance schedule</li> <li>• Identify and apply all emergency equipment and supplies</li> <li>• Conduct safety awareness training to sub-ordinates</li> <li>• Monitor safety environment</li> <li>• Manage uses of safety gears</li> <li>• Cleaning tools and equipment</li> <li>• Storing tools and equipment</li> <li>•</li> </ul>		<ul style="list-style-type: none"> <li>• Monitor safe working environment</li> <li>• Manage uses of safety gears</li> </ul> <p><b>Principles:</b> The student should state the principles of:</p> <ul style="list-style-type: none"> <li>• Preparing inspection check lists</li> <li>• Preparing warning signs and safety instructions</li> <li>• Identifying hazardous materials</li> <li>• Preparing and conducting training</li> <li>• Handling hazardous materials</li> </ul> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Explain the functions of the inspection check list</li> </ul>		

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				Process Assessment	Services Assessment	Knowledge Assessment		
						<ul style="list-style-type: none"> <li>• Highlight the importance of posting warning sign and safety instructions</li> <li>• Elaborate the advantages of risk assessment</li> <li>• Highlight the importance of carry out accident investigation</li> <li>• Highlight the importance of monitoring safety at working place</li> </ul> <p><b>Circumstantial knowledge</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• Safety precautions while managing hazards</li> <li>• Safe handling of tools and equipment</li> <li>• Waste disposal</li> </ul>		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
		(c) Controlling Physical hazards	<p><b>Brainstorm:</b> Guide students to brainstorm on physical hazards</p> <p><b>Demonstration:</b> Guide students to demonstrate how to apply methods and techniques of controlling physical hazards</p> <p><b>Activity:</b> Organize the students in manageable group to apply methods and techniques of controlling physical hazards in school workshop or premises</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>• Interpret service manuals</li> <li>• Select tools and equipment</li> <li>• Use OSHA rules and regulations</li> <li>• Prepare workshop inspection report</li> <li>• Prepare workshop colour code and safety signs</li> <li>• Identify any hazardous materials</li> <li>• Handle hazardous materials</li> <li>• Prepare a preventive maintenance schedule</li> </ul>	Physical Hazards, risks, incident and accidents are managed according to OSHA's rules and regulations	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should explain how to:</p> <ul style="list-style-type: none"> <li>• Interpret OSHA rules and regulations</li> <li>• Use safety gears</li> <li>• Prepare preventive maintenance schedule and inspection report</li> <li>• Prepare warning signs and safety instructions</li> <li>• Conduct assessment</li> <li>• Carry out accident investigation</li> <li>• Monitor safe working environment</li> <li>• Manage uses of safety gears</li> </ul>	<p>The following tools, safety gears and equipment are to be available:</p> <ul style="list-style-type: none"> <li>• Electrical equipment</li> <li>• Mechanical equipment</li> <li>• Power machines</li> <li>• Measuring tools</li> <li>• Cutting tools</li> <li>• First aid kit</li> <li>• Fire extinguishers</li> <li>• Service manuals</li> <li>• OSHA rules and regulations</li> <li>• Helmet</li> <li>• Gloves</li> <li>• Ear plug</li> <li>• Mask</li> <li>• Gloves</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
				<ul style="list-style-type: none"> <li>Identify and apply all emergency equipment and supplies</li> <li>Conduct safety awareness training to sub-ordinates</li> <li>Monitor safety environment</li> <li>Manage uses of safety gears</li> <li>Cleaning tools and equipment</li> <li>Storing tools and equipment</li> </ul>		<p><b>Principles:</b> The student should explain the principles of:</p> <ul style="list-style-type: none"> <li>Preparing inspection check lists</li> <li>Preparing warning signs and safety instructions</li> <li>Identifying hazardous materials</li> <li>Preparing and conducting training</li> <li>Handling hazardous materials</li> </ul> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>Explain the Functions of inspection check list</li> <li>Highlight the importance of posting warning sign and safety instructions</li> </ul>		



Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						<ul style="list-style-type: none"> <li>• Elaborate the advantages of risk assessment</li> <li>• Highlight the importance of carrying out accident investigation</li> <li>• Highlight the importance of monitoring safety at working place</li> </ul> <p><b>Circumstantial knowledge</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• Safety precautions while managing hazards</li> <li>• Safe handling of tools and equipment</li> <li>• Waste disposal</li> </ul>		
	4.2 Carrying out risk	(a) Controlling risk	<b>Think-ink-pair-share:</b>	<b>The student should be able</b>	Risk assessment	<b>Knowledge evidence:</b>	The following tools, safety gears	58

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
	assessment		<p>Guide students through think-ink-pair-share to explain different risk</p> <p><b>Demonstration:</b> Guide students to demonstrate how to apply methods and techniques to control risks</p> <p><b>Activity:</b> Organize the students in manageable groups to control risk in school workshops or premises</p>	<p><b>to:</b></p> <ul style="list-style-type: none"> <li>• Interpret service manuals</li> <li>• Select tools and equipment</li> <li>• Supervise practice safe workshop practices to protect yourself, others and properties</li> <li>• React correctly and safely when faced with an emergency</li> <li>• Identify and apply correctly all emergency equipment and supplies</li> <li>• Make periodic inspections of workshop area and all equipment</li> </ul>	carried out as per OSHA standard and automobile regulations	<p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should explain how to:</p> <ul style="list-style-type: none"> <li>• Identify hazardous materials</li> <li>• Handle hazardous materials</li> <li>• Prepare inspection check list</li> </ul> <p><b>Principles:</b> The student should explain the principles of:</p> <ul style="list-style-type: none"> <li>• Dealing with an emergency situation</li> <li>• Conducting safety training</li> <li>• Hazards Identification procedures</li> </ul> <p><b>Theories:</b> The student should explain how to:</p> <ul style="list-style-type: none"> <li>• Carryout risk assessment</li> </ul>	<p>and equipment are to be available:</p> <ul style="list-style-type: none"> <li>• Service manuals</li> <li>• OSHA regulations</li> <li>• Workshop rules</li> <li>• Camera</li> <li>• Risk assessment sheet</li> <li>• Mask</li> <li>• Ear plug</li> <li>• Gloves</li> <li>• Overall</li> <li>• Safety boots</li> <li>• Safety clear glasses</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
				and prepare report • Conduct safety training • Identify any hazardous materials • Handle hazardous materials correctly • Prepare universal workshop colour codes and know what the colour represent • Make out and file safety report • Beware of the dangerous compressed air • Ensure availability of personal protective equipment • Supervise		• Conduct safety training • Inspect workshop areas tools and equipment • Handle hazardous materials correctly  <b>Circumstantial knowledge</b>  <b>Detailed knowledge about:</b> • Safety precautions while carrying out risk management • Safe handling of tools and equipment • Waste disposal		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
				compressed air rules • Monitor good environmental practices • Clean tools and equipment • Store tools and equipment				
		(b) Managing safety gears	<b>Brainstorm:</b> Guide students to brainstorm on methods and techniques of managing safety gears  <b>Practical work:</b> Guide student to manage safety gears  <b>Activity:</b> Organize the students in manageable group to apply methods and techniques of managing safety	<b>The student should be able to:</b> • Select tools and equipment • React correctly and safely when faced with an emergency • Identify and apply correctly all emergency equipment and supplies • Conduct	Risk assessment carried out as per OSHA standards and automobile regulations	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should elaborate how to: • Conduct safety training • Identify hazardous materials • Handle hazardous materials • Prepare inspection report	The following tools, safety gears and equipment are to be available: • Service manuals • OSHA regulations • Workshop rules • Camera • Risk assessment sheet • Mask • Ear plug • Gloves • Overall • Safety boots • Safety clear	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			gears in the school workshop	safety training <ul style="list-style-type: none"> <li>• Identify any safety hazardous materials</li> <li>• Make out and file safe report</li> <li>• Be aware of the dangerous of compressed air</li> <li>• Ensure availability of personal protective equipment</li> <li>• Monitor good environmental practices</li> <li>• Observe safety regulations and rules</li> <li>• Clean tools and equipment</li> <li>• Store tools and equipment</li> </ul>		<b>Principles:</b> The student should outline the principles of: <ul style="list-style-type: none"> <li>• Reacting correctly and safely when faced with an emergency</li> <li>• Identifying and applying correctly all emergency equipment and supplies</li> <li>• Conducting safety training</li> <li>• Identifying safely hazardous materials</li> <li>• Handling hazardous materials</li> </ul> <b>Theories:</b> The student should describe how to : <ul style="list-style-type: none"> <li>• Carryout risk assessment</li> <li>• Conduct safety training</li> <li>• Inspect workshop</li> </ul>	glasses	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						areas tools and equipment <ul style="list-style-type: none"> <li>• Handle Hazardous material correctly</li> <li>• Follow compressed air rules</li> </ul> <b>Circumstantial knowledge</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• OSHA rules and regulations</li> <li>• Workshop rules and regulations</li> <li>• Safety precautions while carrying out risk management</li> <li>• Safe handling of tools and equipment</li> <li>• Waste disposal</li> </ul>		
	4.3 Managing environment	(a) Managing air pollution	<b>Think-ink-pair-share:</b> Guide students through think-ink-pair-share to identify methods and techniques for managing air	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Select tools and safety gears</li> <li>• Identify environmental hazards</li> </ul>	Air pollution managed as per EMA rules and regulations	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain how to:	The following tools, safety gears and equipment are to be available: <ul style="list-style-type: none"> <li>• Cleaning Tool kit</li> <li>• Gumboots/ Safety boots</li> <li>• Gloves</li> </ul>	63

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>pollution</p> <p><b>Scenario:</b> Organize students in manageable groups and provide scenarios for them to investigate how to manage air pollution</p> <p><b>Activity:</b> Organize the students in manageable group to apply methods and techniques of managing air pollution in school environment</p>	<ul style="list-style-type: none"> <li>• Handle environmental hazards</li> <li>• Handle different types of wastes as per EMA</li> <li>• Manage the environment</li> <li>• Conduct safety awareness training to subordinates</li> <li>• Clean tools and equipment</li> <li>• Store tools and safety gears</li> <li>•</li> <li>•</li> </ul>		<ul style="list-style-type: none"> <li>• Interpret EMA rules and regulations</li> <li>• Monitor safe working environment</li> <li>• Control air pollution</li> <li>• Control different types of waste</li> </ul> <p><b>Principles:</b> The student should outline the principles of:</p> <ul style="list-style-type: none"> <li>• Managing air pollution</li> <li>• Handling environmental safety work</li> <li>• Preparing and conducting training</li> <li>• Handling different types of waste</li> </ul> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Explain the Importance of safe work environment</li> </ul>	<ul style="list-style-type: none"> <li>• Overalls</li> <li>• Cleaning materials</li> <li>• Hoe</li> <li>• Broom</li> <li>• Brush</li> <li>• Safety gears</li> <li>• Dust covers</li> <li>• Dust mask</li> <li>• Wheel barrow</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						<ul style="list-style-type: none"> <li>• Explain types of air pollution</li> <li>• Describe advantages of monitoring environmental pollution</li> <li>• Highlight the importance of preparing environmental schedule</li> <li>• Highlight the importance of control different types of wastes</li> </ul> <p><b>Circumstantial knowledge</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• NEMC rules and regulations</li> <li>• OHSs rules and regulations</li> <li>• OSHA rules and regulations</li> <li>• Workshop rules and regulations</li> <li>• Safe working</li> </ul>		



Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						practices • Waste disposal procedures		
		(b) Managing water pollution	<b>Brainstorm:</b> Guide students to brainstorm on methods and techniques for managing water pollution <b>Scenario:</b> Organize students in manageable groups and provide scenarios for them to investigate how to manage water pollution <b>Activity:</b> Organize the students in manageable group to apply methods and techniques of managing water pollution in school environments	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Select tools and safety gears</li> <li>• Identify environmental hazards</li> <li>• Handle environmental hazards</li> <li>• Handle different types of wastes as per EMA</li> <li>• Manage the environment</li> <li>• Conduct safety awareness training to subordinates</li> <li>• Clean tools and equipment</li> <li>• Store tools and safety</li> </ul>	Water pollution managed as per EMA rules and regulations	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The student should explain how to: <ul style="list-style-type: none"> <li>• Interpret EMA rules and regulations</li> <li>• Monitor safe working environment</li> <li>• Control water pollution</li> <li>• Control different types of waste</li> </ul> <b>Principles:</b> The student should state the principles of: <ul style="list-style-type: none"> <li>• Managing water pollution</li> <li>• Handling environmental</li> </ul>	The following tools, safety gears and equipment are to be available: <ul style="list-style-type: none"> <li>• Cleaning Tool kit</li> <li>• Gumboots/ Safety boots</li> <li>• Gloves</li> <li>• Overalls</li> <li>• Cleaning materials</li> <li>• Hoe</li> <li>• Broom</li> <li>• Brush</li> <li>• Safety gears</li> <li>• Dust covers</li> <li>• Dust mask</li> <li>• Wheel barrow</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
				gears • •		safety work • Preparing and conducting training • Handling different types of waste  <b>Theories:</b> The student should: • Highlight the importance of a safe work environment • Explain types of water pollution • Advantages of monitoring environmental pollution • Elaborate importance of preparing an environmental schedule • Elaborate importance of controlling different types of wastes  <b>Circumstantial</b>		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						<b>knowledge</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• NEMC rules and regulations</li> <li>• OHS rules and regulations</li> <li>• OSHA rules and regulations</li> <li>• Workshop rules and regulations</li> <li>• Safe working practices</li> <li>• Waste disposal procedures</li> </ul>		
		(c) Managing land pollution	<b>Brainstorm:</b> Guide students to define, brainstorm on techniques for managing land pollution <b>Scenario:</b> Organize students in manageable groups and provide scenarios for them to investigate how to manage land pollution	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Select tools and safety gears</li> <li>• Identify environmental hazards</li> <li>• Handle environmental hazards</li> <li>• Handle different types</li> </ul>	Land pollution managed as per EMA rules and regulations	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain how to: <ul style="list-style-type: none"> <li>• Interpret EMA rules and regulations</li> <li>• Monitor safe working environment</li> <li>• Control</li> </ul>	The following tools, safety gears and equipment are to be available: <ul style="list-style-type: none"> <li>• Cleaning Tool kit</li> <li>• Gumboots/ Safety boots</li> <li>• Gloves</li> <li>• Overalls</li> <li>• Cleaning materials</li> <li>• Hoe</li> <li>• Broom</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<b>Activity:</b> Organize the students in manageable group to apply methods and techniques of Managing land pollution	of waste as per EMA <ul style="list-style-type: none"> <li>• Manage the environment</li> <li>• Conduct safety awareness training to subordinates</li> <li>• Clean tools and equipment</li> <li>• Store tools and safety gears</li> </ul>		environment Land pollution <ul style="list-style-type: none"> <li>• Control different types of waste</li> </ul> <b>Principles:</b> The student should state the principles of: <ul style="list-style-type: none"> <li>• Managing land pollution</li> <li>• Handling environmental safety work</li> <li>• Preparing and conducting training</li> <li>• Handling different types of waste</li> </ul> <b>Theories:</b> The student should : <ul style="list-style-type: none"> <li>• Highlight the importance of a safe work environment</li> <li>• Explain types of environmental pollution</li> <li>• Discuss the advantages of monitoring land</li> </ul>	<ul style="list-style-type: none"> <li>• Brush</li> <li>• Safety gears</li> <li>• Dust covers</li> <li>• Dust mask</li> <li>• Wheel barrow</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						<p>pollution</p> <ul style="list-style-type: none"> <li>• Highlight the importance of preparing the environmental schedule</li> <li>• Highlight the importance of controlling different types of wastes</li> </ul> <p><b>Circumstantial knowledge</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• NEMC rules and regulations</li> <li>• OHSs rules and regulation</li> <li>• OSHA rules and regulations</li> <li>• Workshop rules and regulations</li> <li>• Safe working practices</li> <li>• Waste disposal procedures</li> <li>• Safety knowledge while managing</li> </ul>		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						land pollution <ul style="list-style-type: none"> <li>• Safe handling of cleaning tools and equipment</li> <li>• Waste disposal</li> </ul>		
5 Managing preventive maintenance	5.1 Planing preventive maintenance	(a) Preparing schedules for preventive maintenance of tools, machines and equipment	<b>Group Discussion:</b> Guide students in groups to collaboratively describe the concepts related to preventive maintenance <b>Demonstration:</b> Guide student to demonstrate how apply methods and techniques for preparing schedules of preventive maintenance of tools and machines <b>Activity:</b> Organize the students in manageable group	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Prepare inform action in the inventory list</li> <li>• Identify source of information in inventory list</li> <li>• Mark the equipment</li> <li>• Prepare facility register</li> <li>• Identify proper manuals</li> <li>• Interpreted manual</li> <li>• Carry out physical inspection of machine/equi</li> </ul>	A Prepared preventive maintenance work schedule workshop tools and equipment conform technical specifications	<b>Knowledge Evidence</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The student should explain how to prepare inventory and work schedule for preventive maintenance  <b>Principles:</b> The student should state the principles of: <ul style="list-style-type: none"> <li>• Inventory checking</li> <li>• Preventive maintenance work schedule</li> </ul> <b>Theories:</b> The student should explain: <ul style="list-style-type: none"> <li>• Information in the inventory list</li> <li>• Sources of</li> </ul>	The following tools, safety gears and equipment are to be available: <ul style="list-style-type: none"> <li>• Store ledger</li> <li>• Inventory record book</li> <li>• Pen</li> <li>• Papers</li> <li>• Bin card</li> <li>• Ruler</li> <li>• Pencil</li> <li>• Eraser</li> <li>• Manila sheet</li> <li>• Marker pen</li> <li>• Safety boots</li> <li>• Safety goggles</li> <li>• Collection fluid</li> </ul>	58

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			preparing schedules for preventive maintenance of school's workshop tools, machines and equipment	<p>ment</p> <ul style="list-style-type: none"> <li>• Use information to prepare maintenance schedule</li> </ul>		<p>information on the inventory list</p> <p><b>Circumstantial knowledge:</b> <b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• Safety precautions</li> <li>• NEMC rules and regulations</li> <li>• OHSs rules and regulation</li> <li>• OSHA rules and regulations</li> <li>• Workshop rules and regulations</li> <li>• Safe working practices</li> <li>• Waste disposal procedures</li> </ul>		
		(b) Preparing inspection check list of tools, equipment and machine	<p><b>Brainstorm:</b> Guide students to brainstorm on checking a list of tools, equipment and machine</p> <p><b>Demonstration:</b> Guide students to demonstrate how to apply methods and techniques for preparing the</p>	<p><b>The students should be able to:</b></p> <ul style="list-style-type: none"> <li>• Identify maintenance activities</li> <li>• Prepare inspection check list</li> <li>• Write report</li> </ul>	Inspection check list prepared conforms to technical specifications	<p><b>Knowledge Evidence</b> <b>Detailed knowledge of Methods used:</b> The student should explain how to</p> <ul style="list-style-type: none"> <li>• Prepare workshop/workplace inspection check list</li> <li>• Plan and prepare</li> </ul>	<p>The following tools, safety gears and equipment are to be available:</p> <ul style="list-style-type: none"> <li>• Papers</li> <li>• Manila sheets</li> <li>• Erasers</li> <li>• Pencils</li> <li>• Mark pens</li> <li>• Pens</li> <li>• Ruler</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			inspection checking list of tools, equipment and machines <b>Activity:</b> Organize the students in manageable groups to prepare the inspection checking list of the school's workshop tools, equipment and machine			check list  <b>Principles:</b> The student should explain the principles of: <ul style="list-style-type: none"> <li>• Writing check list of preventive maintenance</li> </ul> <b>Theories:</b> The student should explain: <ul style="list-style-type: none"> <li>• Importance of interpreting service manuals</li> <li>• Importance of preparing check list</li> </ul> <b>Circumstantial knowledge:</b> <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Safety precautions while planning preventive maintenance</li> <li>• Safe handling of tools and</li> </ul>	<ul style="list-style-type: none"> <li>• Safety requirement</li> <li>• Bin card/check list</li> <li>• Computer</li> <li>• Printer</li> </ul>	



Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						equipment • Waste disposal procedures		
	5.2 Supervising preventive maintenance	(a) Performing preventive maintenance of tools, equipment and machines	<p><b>Think-ink-pair-share:</b> Guide students through think-ink-pair-share to, explain preventive maintenance of tools</p> <p><b>Demonstration:</b> Guide students to demonstrate how to apply methods and techniques for performing preventive maintenance of tools</p> <p><b>Activity:</b> Organize the students in manageable group to perform preventive maintenance of school's workshop,</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>• Interpret service manuals</li> <li>• Conduct workshop inspection report</li> <li>• Prepare and apply workshop preventive maintenance schedule</li> <li>• Plan and conduct preventive maintenance training</li> <li>• Practice correct hand tools and equipment safety</li> <li>• Practice good</li> </ul>	Preventive maintenance of tools, equipment, machines and building are coordinated as per workshop standards	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should explain how to:</p> <ul style="list-style-type: none"> <li>• Plan and conduct preventive maintenance training</li> <li>• Correct hand tools and equipment safety</li> <li>• Follow good environmental practices</li> </ul> <p><b>Principles:</b> The student should explain the principles of:</p> <ul style="list-style-type: none"> <li>• Preparing and applying</li> </ul>	<p>The following tools, safety gears and equipment are to be available:</p> <ul style="list-style-type: none"> <li>• General hand foot kit</li> <li>• Workshop tools, equipment and machines</li> <li>• Service manuals</li> <li>• Workshop rules and regulations</li> <li>• Gloves</li> <li>• Overall</li> <li>• Safety boots</li> <li>• Safety clear glasses</li> <li>• Helmet</li> <li>• Mask</li> <li>• Ear plug</li> </ul>	55

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			equipment and machines	electrical safety <ul style="list-style-type: none"> <li>• Monitor good environmental practices</li> <li>• Clean tools and equipment</li> </ul> Store tools and equipment		preventive maintenance schedule <ul style="list-style-type: none"> <li>• Plan and conduct preventive maintenance training</li> </ul> <b>Theories:</b> The student should explain: <ul style="list-style-type: none"> <li>• Importance of performing preventive maintenance</li> </ul> <b>Circumstantial knowledge</b> <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Safety precautions while coordinating preventive maintenance</li> <li>• Safe handling of tools and equipment</li> <li>• Waste disposal</li> </ul>		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
		(b) Performing preventive maintenance of working environment	<b>Brainstorm:</b> Guide students to brainstorm on preventive maintenance of tools, equipment and machines <b>Demonstration:</b> Guide students to demonstrate how to apply methods and techniques for performing preventive maintenance of the working environment <b>Activity:</b> Organize the students in manageable groups to perform preventive maintenance of the working environment	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Interpret service manuals</li> <li>• Read and apply rules and regulations</li> <li>• Prepare and apply workshop inspection report</li> <li>• Prepare and use safety signs and colour code</li> <li>• Prepare and apply workshop preventive maintenance schedule</li> <li>• Plan and conduct preventive maintenance training</li> <li>• Practise correct hand</li> </ul>	Preventive maintenance of tools, equipment, machines and building are performed as per workshop standards	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The student should : <ul style="list-style-type: none"> <li>• Explain how to prepare and apply workshop preventive schedule</li> <li>• Describe how to plan and conduct preventive maintenance training</li> <li>• Elaborate how to prepare safety signs and colour code</li> <li>• Identify correct hand tools and equipment safety</li> <li>• Explain how to practice correct lift and jack safety</li> <li>• Observe good electrical safety</li> <li>• Highlight how follow good environmental practices</li> </ul>	The following tools, safety gears and equipment are to be available: <ul style="list-style-type: none"> <li>• General hand foot kit</li> <li>• Workshop tools, equipment and machines</li> <li>• Service manuals</li> <li>• Workshop rules and regulations</li> <li>• Gloves</li> <li>• Overall</li> <li>• Safety boots</li> <li>• Safety clear glasses</li> <li>• Helmet</li> <li>• Mask</li> <li>• Ear plug</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
				tools and equipment safety <ul style="list-style-type: none"> <li>• Practise good electrical safety</li> <li>• Clean tools and equipment</li> <li>• Store tools and equipment</li> </ul>		<b>Principles:</b> The student should state the principles of: <ul style="list-style-type: none"> <li>• Preparing and applying preventive maintenance schedule</li> <li>• Preparing and use safety signs and colour code</li> <li>• Planning and conducting preventive maintenance training</li> </ul> <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>• Explain the importance of planning and conducting preventive maintenance training</li> <li>• Explain the importance of following good environmental practices</li> </ul>		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						<ul style="list-style-type: none"> <li>Highlight the importance of Performing preventive maintenance of the working environment</li> </ul> <p><b>Circumstantial knowledge</b> <b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>Safety precautions while planning preventive maintenance</li> <li>Safe handling of tools and equipment</li> <li>Waste disposal</li> </ul>		
6Performing fabrication of vehicle body components	6.1 Carrying out fabrication of vehicle body panel	(a) Making wing panels	<p><b>Brainstorming:</b> Guide the students to define, and explain different vehicle wing panels</p> <p><b>Simulation:</b> Provide the students with</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> <li>Interpret working drawings</li> <li>Take correct</li> </ul>	Wing panel fabricated as per technical specifications	<p><b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The student should explain how to wing panels</p> <p><b>Principles:</b> The student should</p>	<p>The following tools, safety gears and equipment are to be available:</p> <ul style="list-style-type: none"> <li>Working drawing</li> <li>Measuring tape</li> <li>Try square</li> <li>Tool box</li> <li>Hammer</li> </ul>	22

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			several videos showing how to make vehicle wing panels  <b>Demonstration:</b> Guide students to demonstrate how to make vehicle wing panels  <b>Practical Activity:</b> Organise the students into manageable groups and guide them to wing vehicle panels	measurement <ul style="list-style-type: none"> <li>• Calculate allowances using formulae</li> <li>• Develop different types of patterns</li> <li>• Operate different types of sheet metal works equipment</li> <li>• Assemble the developed patterns to form the required item as per drawing</li> <li>• Observe safety regulation rules</li> <li>• Clean work place</li> <li>• Clean and store tools and equipment</li> </ul>		explain the principles of: <ul style="list-style-type: none"> <li>• Developing different types of patterns</li> <li>• Transforming drawing measurement to a sheet metal</li> <li>• Obtaining forming allowances</li> </ul> <b>Theories:</b> The student should : <ul style="list-style-type: none"> <li>• Describe the properties of materials</li> <li>• Explain transformation of measurements from drawing to a sheet metal</li> <li>• Explain the construction of geometrical figures</li> <li>• Outline the development techniques of cylinder, cylinder with oblique top and cones</li> </ul>	<ul style="list-style-type: none"> <li>• Scriber</li> <li>• Grooving tools</li> <li>• Bending machine</li> <li>• Seaming machine</li> <li>• Cutting machine</li> <li>• Forming tools</li> <li>• Clear goggles</li> <li>• Leather apron</li> <li>• Leather gloves</li> <li>• Industrial boots</li> <li>• Canvas spats</li> <li>• Overalls</li> <li>• Anvil</li> <li>• Bench vice</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						<b>Circumstantial knowledge:</b> <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Safety precautions to be observed while performing sheet metal works</li> </ul>		
		(b) Making vehicle bonnets	<b>Brainstorming:</b> Guide the students to define, and explain vehicle bonnet panels <b>Activity:</b> Organise the students into manageable groups to make vehicle bonnets	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Interpret working drawings</li> <li>• Take correct measurement</li> <li>• Calculate allowances using formulae</li> <li>• Develop different types of patterns</li> <li>• Operate different types of sheet metal works equipment</li> </ul>	Vehicle bonnet fabricated as per technical specifications	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The student should explain how to make bonnets <b>Principles:</b> The student should state the principles of: <ul style="list-style-type: none"> <li>• Developing different types of patterns</li> <li>• Transforming drawing measurement to a sheet metal</li> <li>• Obtaining forming allowances</li> </ul>	The following tools, safety gears and equipment are to be available: <ul style="list-style-type: none"> <li>• Working drawing</li> <li>• Measuring tape</li> <li>• Try square</li> <li>• Tool box</li> <li>• Hammer</li> <li>• Scriber</li> <li>• Grooving tools</li> <li>• Bending machine</li> <li>• Seaming machine</li> <li>• Cutting machine</li> <li>• Forming tools</li> <li>• Clear goggles</li> <li>• Leather apron</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
				<ul style="list-style-type: none"> <li>• Assemble the developed patterns to form the required item as per drawing</li> <li>• Observe safety regulations rules</li> <li>• Clean work place</li> <li>• Clean and store tools and equipment</li> </ul>		<p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Describe the properties of materials</li> <li>• Explain the transformation of measurements from drawing to a sheet metal</li> <li>• Show how to construct of geometrical figures</li> <li>• Outline the development techniques of cylinder, cylinder with oblique top and cones</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p> <p>Safety precautions to be observed while performing sheet metal works</p>	<ul style="list-style-type: none"> <li>• Leather gloves</li> <li>• Industrial boots</li> <li>• Canvas spats</li> <li>• Overalls</li> <li>• Anvil</li> <li>• Bench vice</li> </ul>	



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				Process Assessment	Services Assessment	Knowledge Assessment		
		(c) Producing door channel	<p><b>Brainstorm:</b> Guide the students to define, and explain vehicle body channels</p> <p><b>Demonstration:</b> Guide students to demonstrate how to make vehicle door channels</p> <p><b>Activity:</b> Organise the students into manageable groups and guide them to make vehicle door channels</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Interpret working drawings</li> <li>• Take correct measurement</li> <li>• Calculate allowances using formulae</li> <li>• Develop different types of patterns</li> <li>• Operate different types of sheet metal works equipment</li> <li>• Assemble the developed patterns to form the required item as per drawing</li> </ul>	Metal channel fabricated as per technical specifications	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should explain how to develop channels from the drawing</p> <p><b>Principles:</b> The student should highlight the principles of:</p> <ul style="list-style-type: none"> <li>• Developing different types of patterns</li> <li>• Transforming drawing measurement to a sheet metal</li> <li>• Obtaining forming allowances</li> </ul> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Describe the properties of</li> </ul>	<p>The following tools, safety gears and equipment are to be available:</p> <ul style="list-style-type: none"> <li>• Working drawing</li> <li>• Measuring tape</li> <li>• Try square</li> <li>• Tool box</li> <li>• Hammer</li> <li>• Scriber</li> <li>• Grooving tools</li> <li>• Bending machine</li> <li>• Seaming machine</li> <li>• Cutting machine</li> <li>• Forming tools</li> <li>• Clear goggles</li> <li>• Leather apron</li> <li>• Leather gloves</li> <li>• Industrial boots</li> <li>• Canvas spats</li> <li>• Overalls</li> <li>• Anvil</li> <li>• Bench vice</li> </ul>	

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				Process Assessment	Services Assessment	Knowledge Assessment		
				<ul style="list-style-type: none"> <li>• Observe safety regulation rules</li> <li>• Clean work place</li> <li>• Clean and store tools and equipment</li> </ul>		materials <ul style="list-style-type: none"> <li>• Explain the transformation of measurements from drawing to a sheet metal</li> <li>• Show how to construct geometrical figures</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p> <p>Safety precautions to be observed while performing sheet metal works</p>		
		(d) Restoring dented panel	<p><b>Brainstorming:</b> Guide the students to define, and explain vehicle dented panel</p> <p><b>Practical Activity:</b> Organise the students into</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Interpret working drawings</li> <li>• Take correct</li> </ul>	Vehicle body restored as per technical specifications	<p><b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The student should explain how to restore dented vehicle panel</p> <p><b>Principles:</b> The</p>	The following tools, safety gears and equipment are to be available: <ul style="list-style-type: none"> <li>• Working drawing</li> <li>• Measuring tape</li> <li>• Try square</li> <li>• Tool box</li> <li>• Hammer</li> </ul>	

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				Process Assessment	Services Assessment	Knowledge Assessment		
			manageable groups and guide them to restore dented vehicle body panels	measurement <ul style="list-style-type: none"> <li>• Calculate allowances using formulae</li> <li>• Develop different types of patterns</li> <li>• Operate different types of sheet metal works equipment</li> <li>• Assemble the developed patterns to form the required item as per drawing</li> <li>• Observe safety regulations rules</li> <li>• Clean work place</li> <li>• Clean and store tools and equipment</li> </ul>		student should state the principles of: <ul style="list-style-type: none"> <li>• Developing different types of patterns</li> <li>• Transforming drawing measurement to a sheet metal</li> <li>• Obtaining forming allowances</li> </ul> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Describe the properties of materials</li> <li>• Explain the transformation of measurements from drawing to a sheet metal</li> <li>• Show how to Construct geometrical figures</li> </ul> <p><b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b>            Safety precautions to be observed while</p>	<ul style="list-style-type: none"> <li>• Scriber</li> <li>• Grooving tools</li> <li>• Bending machine</li> <li>• Seaming machine</li> <li>• Cutting machine</li> <li>• Forming tools</li> <li>• Clear goggles</li> <li>• Leather apron</li> <li>• Leather gloves</li> <li>• Industrial boots</li> <li>• Canvas spats</li> <li>• Overalls</li> <li>• Anvil</li> <li>• Bench vice</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						performing sheet metal works		
		(e) Making bumper using fibber glass	<p><b>Brainstorming:</b> Guide the students to define, and explain vehicle bumpers</p> <p><b>Demonstration:</b> Guide students and demonstrate to them how to make vehicle bumpers using fiberglass</p> <p><b>Activity:</b> Organise the students into manageable groups and guide them to make vehicle bumper panels</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Interpret working drawings</li> <li>• Take correct measurement</li> <li>• Calculate allowances using formulae</li> <li>• Develop different types of patterns</li> <li>• Operate different types of fibber works equipment</li> <li>• Assemble the developed patterns to form the required item as per</li> </ul>	Vehicle bumper fabricated as per technical specifications	<p><b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The student should explain how to develop bumper from the drawing</p> <p><b>Principles:</b> The student should state the principles of:</p> <ul style="list-style-type: none"> <li>• Developing different types of patterns</li> <li>• Transforming drawing measurement to materials</li> </ul> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Describe the properties of materials</li> <li>• Explain the transform measurements from drawing to a sheet</li> </ul>	<p>The following tools, safety gears and equipment are to be available:</p> <ul style="list-style-type: none"> <li>• Working drawing</li> <li>• Measuring tape</li> <li>• Try square</li> <li>• Tool box</li> <li>• Hammer</li> <li>• Scriber</li> <li>• Grooving tools</li> <li>• Cutting machine</li> <li>• Forming tools</li> <li>• Clear goggles</li> <li>• Leather apron</li> <li>• Leather gloves</li> <li>• Industrial boots</li> <li>• Canvas spats</li> <li>• Overalls</li> <li>• Anvil</li> <li>• Bench vice</li> </ul>	

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				Process Assessment	Services Assessment	Knowledge Assessment		
				drawing <ul style="list-style-type: none"> <li>• Observe safety regulations rules</li> <li>• Clean work place</li> <li>• Clean and store tools and equipment</li> </ul>		metal <ul style="list-style-type: none"> <li>• Highlight the importance of using fibber glass to make vehicle body panels</li> </ul> <b>Circumstantial knowledge:</b> <b>Detailed knowledge about:</b> Safety precautions to be observed while performing sheet metal works		
	6.2 Carrying out heavy metal welding	(a) Forming heavy brackets	<b>Brainstorming:</b> Guide the students to define, and explain vehicle brackets  <b>Demonstration:</b> Guide students and demonstrate to them how form heavy brackets for vehicles to <b>Activity:</b> Organise the students into manageable	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Inspect the machine, cable and electrode holder</li> <li>• Interpret working drawing</li> <li>• Prepare materials for</li> </ul>	Formed heavy brackets conform to technical specifications	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The student should explain the forming technique used  <b>Principles:</b> The student should state the principles of: <ul style="list-style-type: none"> <li>• Metal forming</li> <li>• Material flow</li> <li>• Flow stress</li> <li>• Plastic deformation</li> </ul>	The following tools, safety gears and equipment are to be available: <ul style="list-style-type: none"> <li>• Working plan</li> <li>• Welding machine</li> <li>• MIG and TIG machines</li> <li>• Welding cables</li> <li>• Electrode holder</li> <li>• Welding shield</li> <li>• Chipping hammer</li> <li>• Wire brush</li> <li>• Work bench</li> </ul>	23

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			groups and guide them to make vehicle brackets	welding <ul style="list-style-type: none"> <li>• Select type and size of electrode for the job</li> <li>• Set recommended current</li> <li>• Weld a workpiece</li> <li>• Keep on maintaining electrode angle and arc length</li> <li>• Keep on controlling electrode travel speed along the joint</li> <li>• Chip off metal slag and wire brush</li> <li>• Inspect for weld defect</li> <li>• Observe safety regulation rules</li> <li>• Clean tools and equipment</li> </ul>		<b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>• Distinguish types of metals and their properties</li> <li>• Distinguish types and functions of forming equipment</li> <li>• Explain the metallurgical effects on forming equipment</li> <li>• Outline the methods of forming equipment</li> </ul> <b>Circumstantial knowledge:</b> <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Safety precautions to be observed while forming a workpiece</li> </ul>	<ul style="list-style-type: none"> <li>• Welding tongs</li> <li>• Angle grinder</li> <li>• Flat file</li> <li>• Bench vice</li> <li>• Scriber</li> <li>• Earth clamp</li> <li>• Ball pein hammer</li> <li>• Centre punch</li> <li>• Overalls</li> <li>• Leather gloves</li> <li>• Canvas spats</li> <li>• Safety boots</li> <li>• Leather apron</li> </ul>	

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				Process Assessment	Services Assessment	Knowledge Assessment		
				<ul style="list-style-type: none"> <li>Store tools and equipment in safe place</li> </ul>				
		(b) Welding thick chassis frame	<p><b>Brainstorming:</b> Guide the students to define, and explain thick metal welding</p> <p><b>Demonstration:</b> Guide students and demonstrate to them how to weld thick chassis frame to</p> <p><b>Activity:</b> Organise the students into manageable group and guide them to weld heavy vehicle frame</p>	<p><b>The students should be able to:</b></p> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> <li>Inspect the machine, cable and electrode holder</li> <li>Interpret working drawing</li> <li>Prepare materials for welding</li> <li>Select type and size of</li> </ul>	Welded metal conforms to technical specifications	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should explain the welding technique used</p> <p><b>Principles:</b> The student should explain the principles of:</p> <ul style="list-style-type: none"> <li>Arc welding</li> <li>Minimizing distortion</li> <li>Obtaining good penetration</li> <li>Selecting weld</li> </ul>	<p>The following tools, safety gears and equipment are to be available:</p> <ul style="list-style-type: none"> <li>Working plan</li> <li>Welding machine</li> <li>MIG and TIG machines</li> <li>Welding cables</li> <li>Electrode holder</li> <li>Welding shield</li> <li>Chipping hammer</li> <li>Wire brush</li> <li>Work bench</li> <li>Welding tongs</li> <li>Angle grinder</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
				electrode for the job • Set recommended current • Weld a workpiece • Keep on maintaining electrode angle and arc length • Keep on controlling electrode travel speed along the joint • Chip off metal slag and wire brush • Inspect for weld defect • Observe safety regulation rules • Clean tools and equipment • Store tools and equipment in		current  <b>Theories:</b> The student should: • Distinguish the types of metals and their properties • Elaborate the types and functions of welding equipment • Explain groove preparations • Elaborate metallurgical effects on weldment • Describe the characteristics of AC and DC welding machine • Distinguish the types of electrode coatings and function • Differentiate between work angle and lead angle • Explain types of distortion • Describe joint	• Flat file • Bench vice • Scriber • Earth clamp • Ball peen hammer • Centre punch • Overalls • Leather gloves • Canvas spats • Safety boots • Leather apron	



Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
				<ul style="list-style-type: none"> <li>safe place</li> </ul>		design <b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b>  <ul style="list-style-type: none"> <li>Safety precautions to be observed while welding a workpiece</li> </ul>		
		(c) Welding spring hangers	<b>Demonstration:</b> Guide students and demonstrate to them how to weld spring hangers  <b>Activity:</b> Organise the students into manageable groups and guide them to weld spring hangers	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> <li>Inspect the machine, cable and electrode holder</li> <li>Interpret working drawing</li> <li>Prepare materials for welding</li> <li>Select type</li> </ul>	Welded metal conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain the welding technique used  <b>Principles:</b> The student should elaborate the principles of: <ul style="list-style-type: none"> <li>Arc welding</li> <li>Minimizing distortion</li> <li>Obtaining good</li> </ul>	The following tools, safety gears and equipment are to be available: <ul style="list-style-type: none"> <li>Working plan</li> <li>Welding machine</li> <li>MIG and TIG machines</li> <li>Welding cables</li> <li>Electrode holder</li> <li>Welding shield</li> <li>Chipping hammer</li> <li>Wire brush</li> <li>Work bench</li> <li>Welding tongs</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
				and size of electrode for the job • Set recommended current • Weld a workpiece • Keep on maintaining electrode angle and arc length • Keep on controlling electrode travel speed along the joint • Chip off metal slag and wire brush • Inspect for weld defect • Observe safety regulation rules • Clean tools and equipment • Store tools and		penetration • Selecting weld current  <b>Theories:</b> The student should:  • Explain the types of metals and their properties • Elaborate the types and functions of welding equipment • Describe groove preparations • Show metallurgical effects on weldment • Describe the characteristics of AC and DC welding machine • explain the types of electrode coatings and function • Differentiate between work angle and lead angle • Describe the types of distortion • Describe joint	• Angle grinder • Flat file • Bench vice • Scriber • Earth clamp • Ball peen hammer • Centre punch • Overalls • Leather gloves • Canvas spats • Safety boots • Leather apron	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
				equipment in safe place		design <b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b>  Safety precautions to be observed while welding a workpiece		
		(d) Welding spring	<b>Practical work:</b> Guide the students to weld vehicle springs  <b>Activity:</b> Organise the students in manageable group to weld spring	<b>The students should be able to:</b> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Inspect the machine, cable and electrode holder</li> <li>• Interpret working drawing</li> <li>• Prepare materials for welding</li> <li>• Select type and size of</li> </ul>	Welded spring conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain the welding technique used  <b>Principles:</b> The student should explain the principles of: <ul style="list-style-type: none"> <li>• Arc welding</li> <li>• Minimizing distortion</li> <li>• Obtaining good penetration</li> </ul>	The following tools, safety gears and equipment are to be available: <ul style="list-style-type: none"> <li>• Working plan</li> <li>• Welding machine</li> <li>• MIG and TIG machines</li> <li>• Welding cables</li> <li>• Electrode holder</li> <li>• Welding shield</li> <li>• Chipping hammer</li> <li>• Wire brush</li> <li>• Work bench</li> <li>• Welding tongs</li> <li>• Angle grinder</li> <li>• Flat file</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
				electrode for the job • Set recommended current • Weld a workpiece • Keep on maintaining electrode angle and arc length • Keep on controlling electrode travel speed along the joint • Chip off metal slag and wire brush • Inspect for welding defect • Observe safety regulations rules • Clean tools and equipment • Store tools and		• Selecting weld current  <b>Theories:</b> The student should: • Describe types of metals and their properties • Explain the types and functions of welding equipment • Describe groove preparations • Show metallurgical effects on weldment • Explain characteristics of AC and DC welding machine • Explain types of electrode coatings and functions • Differentiate between work angle and lead angle • Describe the types of distortion • Describe joint	• Bench vice • Scriber • Earth clamp • Ball peen hammer • Centre punch • Overalls • Leather gloves • Canvas spats • Safety boots • Leather apron	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
				equipment in safe place		design  <b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b>  Safety precautions to be observed while welding a workpiece		
7 Performing installation of vehicle body attachment	7.1 Carrying out installation of a wind screen and vent glass	(a) Checking pole for straightness	<b>Brainstorming:</b> Guide the students to explain wind screen and vent glass installation  <b>Demonstrations:</b> Guide the students and show them how to check poles for straightness  <b>Practical activity:</b> Organise the	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Fix the rope</li> <li>• Use others to assist</li> <li>• Check for correctness</li> <li>• Check for leakage</li> <li>• Observe safety regulations rules</li> </ul>	The pole frames straighten conforms to technical specifications	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The student should explain the screen and vent glass fixing techniques  <b>Principles:</b> The student should state the principles of: <ul style="list-style-type: none"> <li>• Fixing screen with rubbers</li> <li>• Shock absorption</li> <li>• Apply glass</li> </ul>	The following tools, safety gears and equipment are to be available: <ul style="list-style-type: none"> <li>• Measuring tape</li> <li>• Piece of stung chord</li> <li>• Glass suckers</li> <li>• Set of pliers</li> <li>• Screw drivers</li> <li>• Soft hammers</li> <li>• Panel hammers</li> <li>• Cold chisel</li> <li>• Hand gloves</li> <li>• Overalls</li> <li>• Rubber cutter</li> <li>• Step ladder/stand</li> </ul>	55

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			students into manageable group and guide them to check poles for straightness	<ul style="list-style-type: none"> <li>• Clean tools and store them safely</li> </ul>		holders when fixing  <b>Theories:</b> The student should : <ul style="list-style-type: none"> <li>• Describe glass properties</li> <li>• Explain rubber functions</li> <li>• Identify fixing tools</li> </ul> <b>Circumstantial knowledge:</b> <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Safety precautions to be observed while fixing the screen and vent glass</li> <li>• Environment issues</li> </ul>	<ul style="list-style-type: none"> <li>• Tool box</li> <li>• Scriber</li> <li>• Clear goggles</li> <li>• Leather apron</li> <li>• Leather gloves</li> <li>• Industrial boots</li> </ul>	
		(b) Checking wind screen frame for correct alignment and fitting a wind screen into the frame	<b>Brainstorming:</b> Guide the students to explain wind screen and vent glass installation  Guide the students to check wind screen frame for glass alignment	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Fit rubber to the wind screen</li> </ul>	The wind screen and vent glass installed conform to technical specifications	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The student should explain the screen and vent glass fixing techniques	The following tools, safety gears and equipment are to be available: <ul style="list-style-type: none"> <li>• Measuring tape</li> <li>• Set of pliers</li> <li>• Screw drivers</li> <li>• Soft hammers</li> <li>• Hand gloves</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<b>Practical work:</b> Organise the students in manageable group to check wind screen frame for glass fixing	<ul style="list-style-type: none"> <li>• Fix the rope</li> <li>• Fit the wind screen</li> <li>• Use others to assist</li> <li>• Check for correctness</li> <li>• Check for leakage</li> <li>• Observe safety regulations rules</li> <li>• Clean tools and store them safely</li> </ul>		<b>Principles:</b> The student should state the principles of: <ul style="list-style-type: none"> <li>• Fixing screen with rubbers</li> <li>• Fixing screen with adhesive</li> <li>• Shock absorption material</li> <li>• Tools used in fixing</li> </ul> <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>• Describe glass properties</li> <li>• Explain rubber functions</li> <li>• Identify fixing tools</li> </ul> <b>Circumstantial knowledge:</b> <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Safety precautions to be observed while fixing the screen and vent glass</li> <li>• Environment issues</li> </ul>	<ul style="list-style-type: none"> <li>• Overalls</li> <li>• Rubber cutter</li> <li>• Step ladder/stand</li> <li>• Tool box</li> <li>• Scriber</li> <li>• Clear goggles</li> <li>• Leather apron</li> <li>• Leather gloves</li> <li>• Industrial boots</li> </ul>	
		(c) Fitting	<b>Brainstorming:</b>	<b>The student</b>	The vent	<b>Knowledge</b>	The following	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
		glass window machine and window glass	<p>Guide the students to explain wind screen and vent glass installation</p> <p><b>Demonstrations:</b> Guide the students and show them how to fit glass window machine and window glasses</p> <p><b>Practical activity:</b> Organise the students into manageable groups and guide them to fit glass window machine and window glasses</p>	<p><b>should be able to:</b></p> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Fit rubber to the vent glasses</li> <li>• Fix the rope</li> <li>• Use others to assist</li> <li>• Check for correctness</li> <li>• Fix vent glasses</li> <li>• Check for leakage</li> <li>• Observe safety regulations rules</li> <li>• Clean tools and store them safely</li> </ul>	glasses installed conform to technical specifications	<p><b>evidence:</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The student should explain the screen and vent glass fixing techniques <b>Principles:</b> The student should explain the principles of:</p> <ul style="list-style-type: none"> <li>• Operating window glass</li> <li>• Fixing window</li> <li>• Installing window glass machines material</li> <li>• Tools used in installation</li> </ul> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Describe glass properties</li> <li>• Distinguish types of window machine</li> <li>• Enumerate rubber sealing materials</li> </ul>	<p>tools, safety gears and equipment are to be available:</p> <ul style="list-style-type: none"> <li>• Measuring tape</li> <li>• Glass holding tools</li> <li>• Set of pliers</li> <li>• Screw drivers</li> <li>• Soft hammers</li> <li>• Hand gloves</li> <li>• Overalls</li> <li>• Rubber cutter</li> <li>• Step ladder/stand</li> <li>• Tool box</li> <li>• Scriber</li> <li>• Clear goggles</li> <li>• Leather apron</li> <li>• Leather gloves</li> <li>• Industrial boots</li> </ul>	



Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						and functions • List down fixing tools  <b>Circumstantial knowledge:</b> <b>Detailed knowledge about:</b> • Safety precautions to be observed while fixing the screen and vent glass • Environment issues		
	7.2 Carrying out installation of electrical and body surface fittings	(a) Re-fitting vehicle lightning holders and exterior fixtures	<b>Brainstorming:</b> Guide the students to explain installation of electrical and body surface fittings  <b>Activity:</b> Organise the students in manageable groups and guide them to refit vehicle lightning holders and	<b>The student should be able to:</b> • Select tools, equipment and safety gears • Inspect auto-body • Identify required decorators • Fix channels • Fix side lamp holders • Remove and refit alternator	A decorated car body electrical accessory installed conforms to technical specifications	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The student should explain fitting exterior fixtures  <b>Principles:</b> The student should explain the principles of: • Fitting exterior fixtures • Handling/care procedures	The following tools, safety gears and equipment are to be available: • Set of screw drivers • Adhesives materials • Rivet gun • Soft hammer • Set of spanners • Hand gloves • Overall • Apron • Scraper	58

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			exterior fixtures	<ul style="list-style-type: none"> <li>Remove and refit starter motor</li> <li>Use adhesive where required</li> <li>Use rivets where required</li> <li>Polish the car body</li> <li>Observe safety regulation rules</li> <li>Clean tools</li> <li>Store tools in safe custody</li> </ul>		<ul style="list-style-type: none"> <li>Surface protection</li> </ul> <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>Describe vehicle lighting holders</li> <li>Identify main decorating areas</li> <li>Enumerate decorating materials</li> <li>Provide reasons for front and show grilling</li> <li>Explain ventilation fixtures</li> </ul> <b>Circumstantial knowledge</b> <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>Safety precautions to be observed when performing body decoration</li> </ul>		
		(b) Fitting body grills and channels	<b>Brainstorming:</b> Guide the students to explain installation of electrical and body surface fittings	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> </ul>	Grills show car body conforms to technical specifications	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The student should explain fitting	The following tools, safety gears and equipment are to be available: <ul style="list-style-type: none"> <li>Set of screw drivers</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<b>Demonstrations:</b> Guide the students and show them how to Identify and fit body grills and channels  <b>Activity:</b> Organise the students into manageable group and guide them to fit body grills and channels	<ul style="list-style-type: none"> <li>• Identify required decorators</li> <li>• Fix channels</li> <li>• Fix side lamp holders</li> <li>• Remove and refit alternator</li> <li>• Remove and refit starter motor</li> <li>• Use adhesive where required</li> <li>• Use rivets where required</li> <li>• Observe safety regulations rules</li> <li>• Clean tools</li> <li>• Store tools in safe custody</li> </ul>		exterior fixtures <b>Principles:</b> The student should explain the principles of: <ul style="list-style-type: none"> <li>• Fitting exterior fixtures</li> <li>• Handling/care procedures</li> <li>• Surface protection</li> </ul> <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>• Explain body grills and channels</li> <li>• Distinguish types of grills and channels</li> <li>• Describe decorating materials</li> <li>• Provide reasons for front and show grilling</li> <li>• Describe ventilation fixtures</li> </ul> <b>Circumstantial knowledge</b> <b>Detailed knowledge about:</b> Safety precautions to be observed when performing body	<ul style="list-style-type: none"> <li>• Adhesives materials</li> <li>• Rivet gun</li> <li>• Soft hammer</li> <li>• Set of spanners</li> <li>• Hand gloves</li> <li>• Overall</li> <li>• Apron</li> <li>• Scraper</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						decoration		
		(c) Fitting body decorators /moulding s	<p><b>Brainstorming:</b> Guide the students to explain installation of electrical and body surface fittings</p> <p><b>Demonstrations:</b> Guide the students and show them how to identify and fit body decorators</p> <p><b>Activity:</b> Organise the students into manageable groups and guide them to fit body decorators</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Identify required decorators</li> <li>• Fix channels</li> <li>• Fix side lamp holders</li> <li>• Remove and refit alternator</li> <li>• Remove and refit starter motor</li> <li>• Use adhesive where required</li> <li>• Use rivets where required</li> <li>• Observe safety regulation rules</li> <li>• Clean tools</li> <li>• Store tools in</li> </ul>	A decorated car body conforms to technical specifications	<p><b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The student should explain fitting exterior fixtures <b>Principles:</b> The student should explain the principles of:</p> <ul style="list-style-type: none"> <li>• Fit body decorators</li> <li>• Handling/care procedures</li> <li>• alignments</li> <li>• Surface protection</li> </ul> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Explain body decorators</li> <li>• Distinguish types of decorators</li> <li>• Identify decorating materials</li> <li>• List down moulding procedures</li> <li>• Describe ventilation fixtures</li> </ul> <p><b>Circumstantial</b></p>	<p>The following tools, safety gears and equipment are to be available:</p> <ul style="list-style-type: none"> <li>• Set of screw drivers</li> <li>• Adhesives materials</li> <li>• Rivet gun</li> <li>• Soft hammer</li> <li>• Set of spanners</li> <li>• Hand gloves</li> <li>• Overall</li> <li>• Apron</li> <li>• Scraper</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
				safe custody		<b>knowledge</b> <b>Detailed knowledge about:</b> Safety precautions to be observed when performing body decoration		
		(d) Fixing interior fixtures/trimming	<b>Brainstorming:</b> Guide the students to explain installation of electrical and body surface fittings  <b>Demonstrations:</b> Guide the students and show them how to identify and fix interior body fixtures  <b>Activity:</b> Organise the students into manageable groups and guide them to fit interior	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Identify required decorators</li> <li>• Fix channels</li> <li>• Fix side lamp holders</li> <li>• Remove and refit alternator</li> <li>• Remove and refit starter motor</li> <li>• Use adhesive where required</li> <li>• Use rivets where required</li> </ul>	Interior fixture on car body conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain fitting exterior fixtures  <b>Principles:</b> The student should state the principles of: <ul style="list-style-type: none"> <li>• Fitting interior body fixtures and decorators</li> <li>• Handling/care procedures</li> <li>• alignments</li> <li>• Surface protection and finishing</li> </ul> <b>Theories:</b> The student should:	The following tools, safety gears and equipment are to be available: Set of screw drivers <ul style="list-style-type: none"> <li>• Adhesives materials</li> <li>• Rivet gun</li> <li>• Soft hammer</li> <li>• Set of spanners</li> <li>• Hand gloves</li> <li>• Overall</li> <li>• Apron</li> <li>• Scraper</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			body fixtures	<ul style="list-style-type: none"> <li>Observe safety regulations rules</li> <li>Clean tools</li> <li>Store tools in safe custody</li> </ul>		<ul style="list-style-type: none"> <li>Describe interior body fixtures</li> <li>Distinguish types of fixtures</li> <li>Describe ventilation fixtures</li> </ul> <b>Circumstantial knowledge</b>  <b>Detailed knowledge about:</b>  Safety precautions to be observed when performing body decoration		
		(e) Servicing charging system	<b>Brainstorming:</b>  Guide the students to define and explain the concept of charging systems  <b>Practical Work:</b>  Guide the students to identify and use tools and equipment for repairing charging	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> <li>Dismantle alternator</li> <li>Service charging system components</li> <li>Repair or replace the</li> </ul>	Serviced charging system conforms to technical specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain how to troubleshoot fault and service components of charging systems <b>Principles:</b> The student should state the principle operation of charging	The following tools, safety gears and equipment are to be available: <ul style="list-style-type: none"> <li>Vehicle</li> <li>Electrical bench and vice</li> <li>Tool kit</li> <li>Digital and analogy multi-meters</li> <li>Test light</li> <li>Clamp meter</li> <li>Overcoat</li> <li>Safety boots</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			system and store them as per technical specifications	faulty components Replace faulty components <ul style="list-style-type: none"> <li>• Assemble alternator</li> <li>• Test the performance of charging system</li> <li>• Observe safety</li> <li>• Clean tools, equipment and workplace</li> <li>• Store tools and equipment</li> </ul>		systems  <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>• Explain the functions of different tools and equipment for troubleshooting charging system operation</li> <li>• Identify possible faults, causes and their remedies in the charging system</li> <li>• Discern modern technologies used in automotive charging systems</li> </ul> <b>Circumstantial knowledge</b>  <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Safety precautions while servicing charging system</li> <li>• Safe handling of work tools and equipment</li> </ul>	<ul style="list-style-type: none"> <li>• Safety glass</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						<ul style="list-style-type: none"> <li>Waste disposal</li> </ul>		
		(f) Servicing starting system	<p><b>Brainstorming:</b></p> <p>Guide the students to define and explain the concept of vehicle starting system</p> <p><b>Guidance:</b></p> <p>Assist the students to identify and use tools and equipment for repairing alternators and store them as per technical specifications</p> <p><b>Activity:</b></p> <p>Organise the students into manageable groups and guide them to troubleshoot and service different alternator faults</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> <li>Perform visual inspection to the alternator</li> <li>Repair fault alternator components</li> <li>Replace fault alternator components</li> <li>Assemble alternator</li> <li>Test alternator on bench</li> <li>Fix alternator to engine</li> <li>Measure alternator output</li> <li>Observe safety</li> <li>Clean tools, equipment</li> </ul>	Serviced alternator conforms to technical specifications	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should explain how to:</p> <ul style="list-style-type: none"> <li>Assemble alternator</li> <li>Test alternator on bench</li> <li>Refit alternator to vehicle</li> <li>Measure alternator output while engine running</li> </ul> <p><b>Principles:</b> The student should state the principles of:</p> <ul style="list-style-type: none"> <li>Voltage regulation</li> <li>Operation of alternator</li> <li>Adjusting fan belt</li> </ul> <p><b>Theories:</b> The students should be able to explain:</p> <ul style="list-style-type: none"> <li>Functions of</li> </ul>	<p>The following tools, safety gears and equipment are to be available:</p> <ul style="list-style-type: none"> <li>Vehicle</li> <li>Electrical bench and vice</li> <li>Tool kit</li> <li>Digital and analogy multi-meters</li> <li>Test light</li> <li>Clamp meter</li> <li>Overcoat</li> <li>Safety boots</li> <li>Safety glass</li> </ul>	



Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
				and workplace • Store tools and equipment		different tools and equipment for rectifying alternator faults • Alternator operation • Alternator components <b>Circumstantial knowledge</b> <b>Detailed knowledge about:</b> • Safety precautions while servicing voltage regulators • Safe handling of work tools and equipment • Waste disposal		
8 Managing auto shop	8.1 Establishing tools, equipment and materials profile	(a) Keeping tools and material ledger	<b>Discussion:</b> Guide the students to define and describe tools, equipment and material ledger keeping  <b>Demonstrate:</b>	<b>The student should be able to:</b> • Select tools, equipment and safety gears • Interpret auto-body repair diagram • List type and	Tools, equipment and materials profile hand-book produced as reference for Auto-body mechanics as per catalogue manual specifications	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain how to establish types of tools and equipment	The following tools, safety gears and equipment are to be available: • Skills log-book • Tools and equipment catalogue • Stationeries • Scientific calculator	27

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>Guide the students and show them how to identify, keep various types and quantities of tools, equipment and materials for Auto-body workshop</p> <p><b>Activity:</b></p> <p>Organise the students into manageable groups and guide them to prepare a list of tools, equipment, machine and materials for Auto-body workshop</p>	<p>quantities of tools and equipment for a specific job</p> <ul style="list-style-type: none"> <li>• Fill a requisition</li> <li>• Catalogue the data as a reference tools and equipment profile source book</li> <li>• Observe safety regulation rules</li> <li>• Clean tools and equipment</li> <li>• Store equipment and tools safe</li> </ul>		<p>for a given task</p> <p><b>Principles:</b> The student should state the principles of making a tools and equipment profile for a given job</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Explain the importance of making a standard reference data book of tools required for various Auto-body tasks</li> <li>• Identify store keeping techniques</li> <li>• List down stock taking procedures</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about</b> correctness of information to be included in reference data book</p>	<ul style="list-style-type: none"> <li>• Staple machine</li> <li>• Overcoat</li> <li>• Helmet</li> <li>• Safety goggles</li> <li>• Binding machine</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
		(b) Preparing material profile	<p><b>Discussion:</b> Guide the students to define and explain material ledger keeping</p> <p><b>Guidance:</b> Help the students on how to identify type and quantities materials for Auto-body mechanics</p> <p><b>Activity:</b> Organise the students into manageable groups and guide them to prepare a list of materials for specific job</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>• Select tools, equipment and safety gears</li> <li>• Interpret auto-body repair diagram</li> <li>• List types and quantities of tools and equipment for a specific job</li> <li>• Fill a requisition</li> <li>• Catalogue the data as a reference tools and equipment profile source book</li> <li>• Observe safety regulations rules</li> <li>• Clean tools and equipment</li> </ul>	Materials profile hand-book produced as reference for Auto-body mechanics as per catalogue manual specifications	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should explain how to establish types of tools and equipment for a given task</p> <p><b>Principles:</b> The student should explain the principles of making material profile for a given job</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Explain the importance of making a standard reference data book materials required for various Auto-body tasks</li> <li>• Describe material flow procedures</li> <li>• Describe store</li> </ul>	<p>The following tools, safety gears and equipment are to be available:</p> <ul style="list-style-type: none"> <li>• Skills log-book</li> <li>• Tools and equipment catalogue</li> <li>• Materials ledger/ inventory book</li> <li>• Stationeries</li> <li>• Scientific calculator</li> <li>• Staple machine</li> <li>• Overcoat</li> <li>• Helmet</li> <li>• Safety goggles</li> <li>• Binding machine</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
				<ul style="list-style-type: none"> <li>Store equipment and tools safe</li> </ul>		keeping techniques <ul style="list-style-type: none"> <li>Enumerate stock taking procedures</li> </ul> <b>Circumstantial knowledge:</b>  <b>Detailed knowledge about</b> correctness of information to be included in reference data book		
		(c) Managing equipment and tools	<b>Discussion:</b> Guide the students to define and describe management of equipment and tools  <b>Activity:</b> Organise the students into manageable groups guide them to practice on tools and equipment management and record keeping	<b>The students should be able to:</b> <ul style="list-style-type: none"> <li>Select tools, equipment and safety gears</li> <li>Interpret auto-body repair diagram</li> <li>List types and quantities of tools and equipment for a specific job</li> <li>Fill a requisition</li> <li>Catalogue the data as a reference</li> </ul>	Tools and equipment managed as per specifications	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The student should explain how to manage tools and equipment for auto mechanics' workshop/ task  <b>Principles:</b> The student should state the principles of: <ul style="list-style-type: none"> <li>Managing tools and equipment</li> <li>Inventory records</li> <li>Stock taking</li> </ul> <b>Theories:</b> The	The following tools, safety gears and equipment are to be available: <ul style="list-style-type: none"> <li>Skills log-book</li> <li>Tools and equipment catalogue</li> <li>Stationeries</li> <li>Scientific calculator</li> <li>Staple machine</li> <li>Overcoat</li> <li>Helmet</li> <li>Safety goggles</li> <li>Binding machine</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
				tools and equipment profile source book • Observe safety regulations rules • Clean tools and equipment • Store equipment and tools safe		student should: • Explain the importance of managing tools and equipment • Identify store keeping techniques • Enumerate stock taking procedures  <b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b> • Data book • Manual books • Parts catalogued		
		(d) Establishing shop layout	<b>Brainstorming:</b> Guide students to define workshop layout  Explain how to Layout workshop service area, machine shop, storage and parking area	<b>The student should be able to:</b> • Select tools and equipment • Plan workshop layout • Locate different	Designed workshop layout conforms to environmental regulations and ministry of labour rules and regulations	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The student should explain how to arrange different workshop sections  <b>Principles:</b> The	The following tools, safety gears and equipment are to be available:  • Organization structures • Workshop building map • Different workshop	

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				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>and explain technique used to lay out workshop auto body repair area</p> <p><b>Field study:</b></p> <p>Guide the students to visit near by auto workshop and identify requirement and steps for establishing an auto body workshop</p> <p><b>Activity:</b></p> <p>Organise the students into manageable groups and guide them to plan and design workshop layout for auto body repair</p>	<p>workshop sections</p> <ul style="list-style-type: none"> <li>• Locate the installation of different machines</li> <li>• Identify places for safety gears equipment</li> <li>• Identify convenient place for stores</li> <li>• Identify convenient place to assemble in case of emergency</li> <li>• Mark emergency exit</li> <li>• Locate information resource centre</li> <li>• Locate laundry and latrines</li> <li>• Design security</li> </ul>		<p>student should state the principles of:</p> <ul style="list-style-type: none"> <li>• Laying out workshop</li> <li>• Machine installation in workshop</li> <li>• Fabrication area / welding booth</li> <li>• Painting booth</li> </ul> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Identify the steps required to design workshop layout</li> <li>• Describe feature of a good location for workshop</li> </ul> <p><b>Circumstantial knowledge</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• Safety handling of work tools and equipment</li> <li>• Environmental safety</li> <li>• Waste disposal</li> </ul>	<p>layouts</p> <ul style="list-style-type: none"> <li>• Overhead projector</li> <li>• Computer with power point</li> <li>• Flip charts</li> <li>• Chalk board</li> <li>• Workshop with various sections</li> <li>• Measuring tools</li> <li>• Highlight mark</li> <li>• Drawing instruments</li> <li>• Handouts</li> <li>• Stationeries</li> <li>• Drawing instruments</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
				system of tools and equipment <ul style="list-style-type: none"> <li>• Design safety system to workers</li> <li>• Identify marks and postures</li> <li>• Place sign mark and postures</li> <li>• Label safety precautions for workshop materials and goods</li> </ul>				
	8.2 Estimating materials and labour costs	(a) Establishing materials required	<b>Brainstorming:</b> Guide the students to define and explain how to estimate materials and labour costs  <b>Demonstration:</b> Organise the students into groups and	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Read inspection report</li> <li>• Prepare material cost estimates</li> <li>• Prepare overhead costs</li> </ul>	Cost materials estimates prepared as per task to be performed	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The student should explain how to: <ul style="list-style-type: none"> <li>• prepare bill of quantities (BOQ)</li> <li>• Calculate the costs of materials</li> <li>• Prepare local</li> </ul>	The following tools, safety gears and equipment are to be available: <ul style="list-style-type: none"> <li>• List of spares and material</li> <li>• Prepared materials</li> <li>• Local purchases order (LPO)</li> <li>• Calculator/Computer</li> </ul>	27

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>demonstrate to them how to establish materials required</p> <p><b>Activity:</b> Organise the students into manageable groups and task them to establish materials required for auto body workshop</p>	<ul style="list-style-type: none"> <li>• Prepare material request</li> <li>• Prepare quotations</li> <li>• Obtain proforma invoice from different shops</li> <li>• Clean the tools and equipment</li> <li>• Store tools, equipment and other materials</li> </ul>		<p>purchase order</p> <p><b>Principles:</b> The student should state the principles of determine material cost estimates</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Explain the importance of estimating materials cost</li> <li>• Elaborate the importance of using genuine materials</li> <li>• Explain how to use of parts catalogue</li> </ul> <p><b>Circumstantial knowledge</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>• Safety precautions involved in performing the task</li> <li>• Safe handling of materials and documents</li> <li>• OSHA</li> </ul>	<ul style="list-style-type: none"> <li>• Stationeries</li> <li>• Overcoat</li> <li>• Safety boot</li> <li>• Binding machine</li> <li>• Material requisition form (Material requisition voucher form (MVR))</li> <li>• Job card</li> <li>• Price list</li> <li>• Mask</li> <li>• Good receive note (GRN)</li> <li>• Gloves</li> <li>•</li> </ul>	



Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						requirements and regulations		
		(b) Establishing price quotation and quality	<p><b>Field study:</b></p> <p>Guide the students to visit nearby vendors of goods and materials, use their prices to establish price for quotation</p> <p><b>Demonstration:</b></p> <p>Organise the students in groups and demonstrate how to establish quantity and price list of materials required</p> <p><b>Practical work:</b></p> <p>Organise the</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>• Read inspection report</li> <li>• Prepare material cost estimates</li> <li>• Prepare overhead costs</li> <li>• Prepare material request</li> <li>• Prepare quotations</li> <li>• Obtain proforma invoice from different shops</li> <li>• Clean the tools and equipment</li> <li>• Store tools, equipment and other materials</li> </ul>	Quantity of materials and price estimates prepared as per task to be performed	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should explain how to:</p> <ul style="list-style-type: none"> <li>• Prepare bill of quantities (BOQ)</li> <li>• Calculate the costs of materials</li> <li>• Prepare local purchase order</li> </ul> <p><b>Principles:</b> The student should explain the principles of determine material prices</p> <p><b>Theories:</b> The student should :</p> <ul style="list-style-type: none"> <li>• Explain the importance of estimating materials cost</li> <li>• Explain the importance of</li> </ul>	<p>The following tools, safety gears and equipment are to be available:</p> <p>:</p> <ul style="list-style-type: none"> <li>• List of spares and material</li> <li>• Prepared materials</li> <li>• Local purchases order (LPO)</li> <li>• Calculator/Computer</li> <li>• Stationeries</li> <li>• Overcoat</li> <li>• Safety boot</li> <li>• Binding machine</li> <li>• Material requisition form (Material requisition voucher form (MVR))</li> <li>• Job card</li> <li>• Price list</li> <li>• Mask</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			students into manageable groups and task them to list amount of material and price list			using genuine materials • Show how to use of parts catalogue  <b>Circumstantial knowledge</b>  <b>Detailed knowledge about:</b>  • Safety precautions involved in performing the task • Safe handling of materials and documents • OSHA requirements and regulations	• Good receive note (GRN) • Gloves	
		(c) Establishing purchase procedure	<b>Brainstorming:</b>  Guide the students to define and explain how to establish purchase procedures	<b>The student should be able to:</b>  • Select tools, equipment and safety gears • Interpret the drawing • Identify tools,	The purchase of materials and labour prepared as per requirement	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain how to:  • Prepare list of	The following tools, safety gears and equipment are to be available: :  • Repair lay out plan • Stationeries • Scientific	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p><b>Discussion:</b></p> <p>Organise the students into groups and ask them to discuss how to establish purchase of materials required</p> <p><b>Practical work:</b></p> <p>Organise the students into manageable groups and task them to list down purchase procedures</p>	<p>equipment, safety gears and required materials</p> <ul style="list-style-type: none"> <li>• Prepare technical specifications</li> <li>• Prepare bills of quantities (BOQ)</li> <li>• Prepare cost estimates for materials</li> <li>• Prepare labour cost including other overheads</li> <li>• Keep documents in proper custody</li> <li>• Observe safety regulations rules</li> <li>• Clean tools and equipment</li> <li>• Store tools and equipment in</li> </ul>		<p>materials</p> <ul style="list-style-type: none"> <li>• Prepare short listed tender document</li> <li>• Prepare open tender document</li> </ul> <p><b>Principles:</b> The student should state the principles of preparing the tender documents</p> <p><b>Theories:</b> The student should :</p> <ul style="list-style-type: none"> <li>• Differentiate between short listed tender and open tender</li> <li>• Explain the application of the short listed and open tenders</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about</b></p> <ul style="list-style-type: none"> <li>• confidentiality of</li> </ul>	<p>calculator</p> <ul style="list-style-type: none"> <li>• Staple machine</li> <li>• Unit prices of the materials</li> <li>• Overcoat</li> <li>• Safety boots</li> <li>• Helmet</li> <li>• Safety goggles</li> <li>• Binding machine</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
				safe place		the tender document • PPRA rules and regulation • NEST procurement procedures		
	8.3 Preparing a small-scale tender document	(a) Establishing marketing procedures	<b>Brainstorming:</b> Guide the students to define and explain how to establish marketing procedures  <b>Discussion:</b> Organise the students into groups and ask them to discuss how to establish marketing procedures  <b>Activity work:</b> Organise the students into	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Prepare related documents (Instruction to renderers, special conditions of contract)</li> <li>• Prepare brochure of the identified materials</li> <li>• Bind the document</li> <li>• Cross check the contents of the tender document</li> <li>• Send documents</li> </ul>	A marketing procedure established as required	<b>Knowledge evidence:</b>  <b>Detailed knowledge of:</b>  <b>Methods used:</b> The student should explain how to: <ul style="list-style-type: none"> <li>• Make advertisement</li> <li>• Prepare short listed service provided</li> <li>• Provide address</li> </ul> <b>Principles:</b> The student should explain the principles of marketing the procedures  <b>Theories:</b> The	The following tools, safety gears and equipment are to be available: <ul style="list-style-type: none"> <li>• Stationeries</li> <li>• Binding machine</li> <li>• Staple machine</li> <li>• Brochures of materials</li> <li>• Overcoat</li> <li>• Safety boots</li> <li>• Safety gloves</li> <li>• Computer and printer</li> <li>• Public procurement Act</li> </ul>	25

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			manageable groups and task them to initiate marketing of auto body repair services			student should : <ul style="list-style-type: none"> <li>Describe advertising procedure</li> </ul> <b>Circumstantial knowledge:</b> <b>Detailed knowledge about</b> <ul style="list-style-type: none"> <li>Publicity rules</li> <li>PPRA rules and regulation</li> <li>NEST procurement procedures</li> </ul>		
		(b) Preparing brochures	<b>Brainstorming:</b> Guide the students to define and explain how to prepare brochures  <b>Discussion:</b> Organise the students into groups and ask	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>Prepare related documents (Instruction to renderers, special conditions of contract)</li> </ul>	A tender document prepared and all contents conform to PPRA requirements	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The student should explain how to: <ul style="list-style-type: none"> <li>Make advertisement</li> <li>Prepare short listed service provided</li> </ul>	The following tools, safety gears and equipment are to be available: <ul style="list-style-type: none"> <li>Stationeries</li> <li>Binding machine</li> <li>Staple machine</li> <li>Brochures of materials</li> <li>Overcoat</li> <li>Safety boots</li> <li>Safety gloves</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>them to discuss how to prepare brochures</p> <p><b>Practical work:</b></p> <p>Organise the students into manageable groups and task them to design brochures of auto body repair services</p>	<ul style="list-style-type: none"> <li>• Prepare brochure of the identified material</li> <li>• Bind the document</li> <li>• Cross check the contents of the tender document</li> <li>• Send documents</li> </ul>		<ul style="list-style-type: none"> <li>• Provide address</li> </ul> <p><b>Principles:</b> The student should explain the principles of marketing procedures</p> <p><b>Theories:</b> The student should explain:</p> <ul style="list-style-type: none"> <li>• Advertising procedure</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about</b></p> <ul style="list-style-type: none"> <li>• Publicity rules</li> <li>• PPRA rules and regulation</li> <li>• NEST procurement procedures</li> </ul>	<ul style="list-style-type: none"> <li>• Computer and printer</li> <li>• Public procurement Act</li> </ul>	
		(c) Preparing tender documents	<p><b>Brainstorming:</b></p> <p>Guide the students to define and explain how to</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>• Prepare</li> </ul>	A tender document prepared and all contents conform to	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge</b></p>	<p>The following tools, safety gears and equipment are to be available:</p> <ul style="list-style-type: none"> <li>• Stationeries</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>prepare tender documents</p> <p><b>Discussion:</b></p> <p>Organise the students into groups and task them to discuss how to prepare tender documents</p> <p><b>Practical work:</b></p> <p>Organise the students into manageable groups and task them to prepare tender document for different auto body repair services</p>	<p>related documents (Instruction to renderers, special conditions of contract)</p> <ul style="list-style-type: none"> <li>• Prepare brochure of the identified materials</li> <li>• Bind the document</li> <li>• Cross check the contents of the tender document</li> <li>• Send documents</li> </ul>	PPRA requirements	<p><b>of:</b></p> <p><b>Methods used:</b> The student should explain how to:</p> <ul style="list-style-type: none"> <li>• Prepare short listed tender documents</li> <li>• Prepare open tender documents</li> </ul> <p><b>Principles:</b> The student should explain the principles of preparing the tender documents</p> <p><b>Theories:</b> The student should :</p> <ul style="list-style-type: none"> <li>• Differentiate between short listed tender and open tender</li> <li>• Elaborate the application of the short listed and open tenders</li> </ul> <p><b>Circumstantial knowledge:</b></p>	<ul style="list-style-type: none"> <li>• Binding machine</li> <li>• Staple machine</li> <li>• Brochures of materials</li> <li>• Overcoat</li> <li>• Safety boots</li> <li>• Safety gloves</li> <li>• Computer and printer</li> <li>• Public procurement Act</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						<b>Detailed knowledge about</b> <ul style="list-style-type: none"> <li>• Publicity rules</li> <li>• PPRA rules and regulations</li> <li>• NEST procurement procedures</li> </ul>		
	8.4 Training subordinates on the job	(a) Establishing on the job training schedule	<b>Brainstorming:</b> Guide the students to define and explain how to establish job training schedule  <b>Discussion:</b> Organise the students into groups and guide them to discuss how to establish on job training schedule  <b>Practical work:</b> Organise the students into manageable groups and task them to establish job training	<ul style="list-style-type: none"> <li>• <b>The student should be able to:</b></li> <li>• Select tools, equipment and safety gears</li> <li>• Prepare capability chart of the subordinates</li> <li>• Identify knowledge and skills to be imported</li> <li>• Identify previous knowledge and skills possessed by the person to be trained</li> <li>• Prepare a training</li> </ul>	A training programme properly prepared and presented as standards according to regulations	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The student should explain how to prepare training programme  <b>Principles:</b> The student should explain the principles of carrying out training programme by using the four steps plan (prepare, present, try-out assign work)  <b>Theories:</b> The student should: <ul style="list-style-type: none"> <li>• Elaborate the necessity of</li> </ul>	The following tools, safety gears and equipment are to be available: <ul style="list-style-type: none"> <li>• Work plan</li> <li>• Automotive spanners</li> <li>• Auto-body tool kit</li> <li>• Auto-body jack (hand)</li> <li>• Auto-body power jack</li> <li>• Auto-body stand</li> <li>• Measuring tape</li> <li>• Work bench</li> <li>• Safety goggles</li> <li>• Safety boots</li> <li>• Safety gloves</li> <li>• Overcoat</li> <li>• Stationary</li> <li>• Workshop</li> </ul>	26



Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			schedule for auto body repair services	programme for the subordinate <ul style="list-style-type: none"> <li>• Carry out the training programme by using four steps plan (prepare, present, try-out, assign work)</li> <li>• Continually assess progress of the students</li> <li>• Make necessary adjustments to the training programme schedule</li> <li>• Observe safety regulations and rules</li> <li>• Clean tools and equipment</li> <li>• Store tools and equipment in</li> </ul>		identifying previous knowledge and skill of the person to be trained <ul style="list-style-type: none"> <li>• Describe change of technology</li> <li>• Explain the importance of step-by-step guidance from simple to complex tasks</li> </ul> <b>Circumstantial knowledge:</b> <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• The skills of the person to be trained</li> <li>• Basic educational psychology</li> <li>• Thorough analysis of training needs</li> </ul>	manuals <ul style="list-style-type: none"> <li>• Seminar room</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
				safe place				
		(b) Conducting training needs assessment	<p><b>Brainstorming:</b></p> <p>Guide the students to define training needs</p> <p>Explain how to prepare training needs and techniques used to prepare training needs</p> <p><b>Site visit:</b></p> <p>Guide the students to visit the near by institutidentify the needs for on job training</p> <p><b>Practical work:</b></p> <p>Organise the students into manageable</p>	<p><b>The student should be able to:</b></p> <ul style="list-style-type: none"> <li>• Select tools and equipment</li> <li>• Prepare capability chart of the subordinates</li> <li>• Conduct training needs assessment</li> <li>• Identify knowledge and skills to be learnt</li> <li>• Identify previous knowledge and skills possessed by the person to be trained</li> <li>• Prepare a training programme for the subordinate</li> <li>• Carryout the</li> </ul>	A training program prepared to meet job requirement according to regulations	<p><b>Knowledge evidence:</b></p> <p><b>Detailed knowledge of:</b></p> <p><b>Methods used:</b> The student should explain how to prepare training programme</p> <p><b>Principles:</b> The student should state the principles of carrying out training programme by using the four steps (plan, prepare, present, try-out assign work)</p> <p><b>Theories:</b> The student should:</p> <ul style="list-style-type: none"> <li>• Elaborate the necessity of identifying previous knowledge and skills of the person to be trained</li> </ul>	<p>The following tools, safety gears and equipment are to be available:</p> <ul style="list-style-type: none"> <li>• Workshop</li> <li>• Tool box</li> <li>• Tools</li> <li>• Multimeter</li> <li>• Workshop machines i.e., <ul style="list-style-type: none"> <li>- Grinding machine</li> <li>- Drilling machine</li> <li>- Valve grinder</li> <li>- Drum and disc service machine</li> <li>- Wheel balancing machine</li> <li>- Wheel alignment machine/gauge</li> <li>- Head light</li> </ul> </li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			groups and task them to prepare training needs  of the Auto body repair section	training programs by using four steps plan (prepare, present, try-out, assign work) • Continually assess progress of workers • Make necessary adjustments to the training programme schedule • Clean the work area • Store tools, equipment, safety gears and other items		<ul style="list-style-type: none"> <li>Describe the importance of step by step guidance from simple to complex tasks</li> </ul> <b>Circumstantial knowledge:</b> <b>Detailed knowledge about:</b> Basic principles of educational psychology	aiming machine - Testing benches - Bench vices - Anvil - Hydraulic press • Surface block • First aid kit • Firefighting equipment • Emergency exit • Overhead projector • Computer • TV • Organization structure • Safety gears	
		(c) Arranging training for subordinates	<b>Brainstorm:</b> Guide students to brainstorm on different training techniques used to train subordinates	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>Select tools and equipment</li> </ul>	A training program prepared to meet job requirements	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The student should	The following tools, safety gears and equipment are to be available: <ul style="list-style-type: none"> <li>Work plan</li> <li>Automotive</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			in workshops <b>Microteaching:</b> Organize students in small groups and guide them to train each other in a specific topic of their interest. <b>Activity:</b> Organize the students in manageable groups and task them to prepare and implement training for workshop subordinates	<ul style="list-style-type: none"> <li>• Prepare capability chart of the subordinates</li> <li>• Conduct training needs assessment</li> <li>• Identify knowledge and skills to be learnt</li> <li>• Identify previous knowledge and skills possessed by the person to be trained</li> <li>• Prepare a training programme for the subordinate</li> <li>• Carryout the training programmes by using four steps plan (prepare, present, try-out, assign</li> </ul>	A person trained is able to execute tasks to required standards according to regulations	explain how to prepare training programme  <b>Principles:</b> The student should explain the principles of carrying out training programme by using the four steps (plan, prepare, present, try-out assign work)  <b>Theories:</b> The student should : <ul style="list-style-type: none"> <li>• Elaborate the necessity of identifying previous knowledge and skills of the person to be trained</li> <li>• Explain the importance of step by step guidance from simple to complex tasks</li> </ul>	spanners <ul style="list-style-type: none"> <li>• Auto-body tool kit</li> <li>• Auto-body jack (hand)</li> <li>• Auto-body power jack</li> <li>• Auto-body stand</li> <li>• Measuring tape</li> <li>• Work bench</li> <li>• Safety goggles</li> <li>• Safety boots</li> <li>• Safety gloves</li> <li>• Overcoat</li> <li>• Stationary</li> <li>• Workshop manuals</li> <li>• Seminar room</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
				work) • Continually assess progress of workers • Make necessary adjustments to the training programme schedule • Clean the work area • Store tools, equipment, safety gears and other items •		<b>Circumstantial knowledge:</b> <b>Detailed knowledge about:</b> Basic principles of educational psychology		
		(d) Establishing manpower level	<b>Discussion:</b> Guide the students to discuss how to Identify roles of staffs at workshop Identify overtime and holidays <b>Activity:</b> Organize the students in manageable groups and task	<b>The student should be able to:</b> • Select tools, equipment and safety gears • Prepare capability chart of the subordinates	A training programme properly established according to regulations	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The student should explain how to establish manpower level <b>Principles:</b> The	The following tools, safety gears and equipment are to be available: • Work plan • Automotive spanners • Auto-body tool kit • Auto-body jack (hand) • Auto-body	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			them to determine hours/day of workshop staff	<ul style="list-style-type: none"> <li>Identify knowledge and skills to be imported</li> <li>Identify previous knowledge and skills possessed by the person to be trained</li> <li>Prepare a training programme for the subordinate</li> <li>Carry out the training programme by using four steps plan (prepare, present, try-out, assign work)</li> <li>Continually assess progress of the students</li> <li>Make necessary adjustments to</li> </ul>		<p>student should explain the principles of establishing need and level of workers</p> <p><b>Theories:</b> The student should :</p> <ul style="list-style-type: none"> <li>Explain the importance of manpower level in working areas</li> <li>Show levels of manpower</li> <li>Describe advantages of manpower levels</li> </ul> <p><b>Circumstantial knowledge:</b> <b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>The skills of the person to be trained</li> <li>Basic educational psychology</li> <li>Thorough analysis of training needs</li> <li>Standing Order</li> </ul>	<p>power jack</p> <ul style="list-style-type: none"> <li>Auto-body stand</li> <li>Measuring tape</li> <li>Work bench</li> <li>Safety goggles</li> <li>Safety boots</li> <li>Safety gloves</li> <li>Overcoat</li> <li>Stationary</li> <li>Workshop manuals</li> <li>Seminar room</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
				the training programme schedule • Observe safety regulations rules • Clean tools and equipment • Store tools and equipment in safe place				
		(e) Advising the administration	<b>Brainstorming:</b> Guide the students to describe advising philosophy  <b>Practical work:</b> Organise the students into manageable groups and guide them to propose the best approach	<b>The student should be able to:</b> • Select tools, equipment and safety gears • Prepare capability chart of the subordinates • Identify knowledge and skills to be imported	A training programme properly prepared and presented  • A person trained is able to execute tasks to required standards according to	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The student should explain how to advise administrative personnel  <b>Principles:</b> The student should state the best practice to advice administrative	The following tools, safety gears and equipment are to be available: • Work plan • Automotive spanners • Auto-body tool kit • Auto-body jack (hand) • Auto-body power jack • Auto-body stand	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			to advise administrative workers for auto body repair workshop	<ul style="list-style-type: none"> <li>Identify previous knowledge and skills possessed by the person to be trained</li> <li>Prepare a training programme for the subordinate</li> <li>Carry out the training programme by using four steps plan (prepare, present, try-out, assign work)</li> <li>Continually assess progress of the students</li> <li>Make necessary adjustments to the training programme schedule</li> <li>Observe</li> </ul>	regulations	<p>personnel <b>Theories:</b> The student should d:</p> <ul style="list-style-type: none"> <li>Describe importance of advising non-technical personnel</li> <li>Enumerate advising methods</li> <li>Elaborate the advantages of advising levels</li> </ul> <p><b>Circumstantial knowledge:</b></p> <p><b>Detailed knowledge about:</b></p> <ul style="list-style-type: none"> <li>Basic advising techniques</li> <li>Levels of manpower</li> </ul>	<ul style="list-style-type: none"> <li>Measuring tape</li> <li>Work bench</li> <li>Safety goggles</li> <li>Safety boots</li> <li>Safety gloves</li> <li>Overcoat</li> <li>Stationary</li> <li>Workshop manuals</li> <li>Seminar room</li> </ul>	



Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
				safety regulations rules • Clean tools and equipment • Store tools and equipment in safe place				
	8.5 Supervising subordinates	(a) Planing work schedule	<b>Brainstorming:</b> Guide the students to describe how to make supervision  <b>Practical work:</b> Organise the students into manageable groups and ask them to discuss a work schedule plan of workers for auto body	<b>The student should be able to:</b> • Maintain discipline and keep control over the employees • Distribute work among the workers in such a way to secure maximum output • Keep coordination among the staff at various levels • Improve	Work plan scheduled correctly as per requirement	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The student should explain how to: • Supervise subordinates • Control flow of work • Use resource properly  <b>Principles:</b> The student should explain the principles of: • Managerial management	The following tools, safety gears and equipment are to be available: • Standing order • Work schedule sheets • Attendance book • Diary book • Work plan • Overcoat • Helmet • Safety boots • Stationary	29

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			repair workshop	efficiency; management keeps sufficient watch and strict inspection • Suggest new ideas and improvements • Arrange for the efficient storing and recording • Make the arrangement of payments and their record • Provide facilities and wages to the workers		• Scientific management  <b>Theories:</b> The student should :  • Elaborate the types of management objectives • Describe managerial abilities  <b>Circumstantial knowledge:</b>  <b>Detailed knowledge about:</b>  • Local cultural norms and social behaviour • Leadership/management styles • Basic knowledge about industrial psychology, supervision skills		
		(b) Supervisin	<b>Brainstorming:</b> Guide the students	<b>The student should be able</b>	Supervision of assigned jobs done to	<b>Knowledge evidence:</b> <b>Detailed knowledge</b>	The following tools, safety gears and equipment are	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
		g a job	to describe how to perform job supervision  <b>Practical work:</b> Organise the students into manageable groups and ask them to plan a work schedule and allocate human labour workers of auto body repair workshop	<b>to:</b> <ul style="list-style-type: none"> <li>• Maintain discipline and keep control over the employees</li> <li>• Distribute work among the workers in such a way to secure maximum output</li> <li>• Keep coordination among the staff at various levels</li> <li>• Improve efficiency; management keeps sufficient watch and strict inspection</li> <li>• Suggest new ideas and improvements</li> <li>• Arrange for the efficient</li> </ul>	specifications and according to schedule	<b>of:</b> <b>Methods used:</b> The student should explain how to: <ul style="list-style-type: none"> <li>• Supervise subordinates</li> <li>• Control flow of work</li> <li>• Use resource properly</li> </ul> <b>Principles:</b> The student should explain the principles of: <ul style="list-style-type: none"> <li>• Managerial management</li> <li>• Scientific management</li> </ul> <b>Theories:</b> The student should : <ul style="list-style-type: none"> <li>• Distinguish types of management</li> <li>• Elaborate the purpose of supervision</li> </ul>	to be available: <ul style="list-style-type: none"> <li>• Job cards</li> <li>• Work schedule sheets</li> <li>• Drawing facilities</li> <li>• Work plan</li> <li>• Overcoat</li> <li>• Helmet</li> <li>• Safety boots</li> <li>• Stationary</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
				storing and recording <ul style="list-style-type: none"> <li>• Make the arrangement of payments and their record</li> <li>• Provide facilities and wages to the workers</li> </ul>		<b>Circumstantial knowledge:</b> <b>Detailed knowledge about:</b> <ul style="list-style-type: none"> <li>• Standing order</li> <li>• Local cultural norms and social behaviour</li> <li>• Leadership/management styles</li> <li>• Basic knowledge about industrial psychology, supervision skills</li> </ul>		
		(c) Inspecting and check the correctness	<b>Brain storming :</b> Guide the students to explain the concept of inspecting and checking the correctness of: <ul style="list-style-type: none"> <li>• Working schedule</li> <li>• Work load</li> <li>• Resource</li> </ul>	<b>The student should be able to:</b> <ul style="list-style-type: none"> <li>• Maintain discipline and keep control over the employees</li> <li>• Distribute work among the workers in such a way to secure maximum</li> </ul>	Work plan scheduled and work load planned correctly	<b>Knowledge evidence:</b> <b>Detailed knowledge of:</b> <b>Methods used:</b> The student should explain how to: <ul style="list-style-type: none"> <li>• Supervise subordinates</li> <li>• Control flow of work</li> <li>• Use resource</li> </ul>	The following tools, safety gears and equipment are to be available: <ul style="list-style-type: none"> <li>• Job cards</li> <li>• Work schedule sheets</li> <li>• Drawing facilities</li> <li>• Work plan</li> <li>• Overcoat</li> <li>• Helmet</li> <li>• Safety boots</li> <li>• Stationary</li> </ul>	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			allocation  <b>Practical work:</b>  Organise the students into manageable groups and guide them to inspect and check the correctness of work schedule plan and human resources allocation for workers of auto body repair workshop	output • Keep coordination among the staff at various levels • Improve efficiency; management keeps sufficient watch and strict inspection • Suggest new ideas and improvements • Arrange for the efficient storing and recording • Make the arrangement of payments and their record • Provide facilities and wages to the workers		properly  <b>Principles:</b> The student should state the principles of:  • Managerial management • Work supervision • Resource allocation  <b>Theories:</b> The student should explain:  • Distinguish types of management • Describe the purpose of supervision • Discuss the aims of resource allocation <b>Circumstantial knowledge:</b> <b>Detailed knowledge about:</b> • Standing order • Local cultural norms and social		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirement / Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						behaviour <ul style="list-style-type: none"> <li>• Leadership/management styles</li> <li>• Basic knowledge about industrial psychology, supervision skills</li> </ul>		

## **12.0 References**

Ministry of Education, Science and Technology. (2025). *Auto Body Repair Syllabus for Ordinary Secondary Education Vocational Stream Form I-IV*. Vocational Education and Training Authority.