

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

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

Certificate of Approval

No. 1982

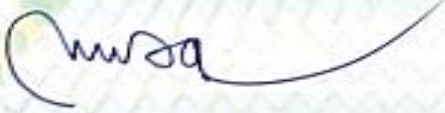
Title of Publication: Electronics Syllabus for Ordinary Secondary Education Vocational Stream Form I-IV

Publisher: Vocational Education and Training Authority

Author: Ministry of Education, Science and Technology

ISBN: 978-9912-750-28-9

This Syllabus was approved by the Ministry of Education, Science and Technology on 26th January 2025 as Syllabus for Electronics for Ordinary Secondary Education Vocational Stream Form I-IV in Tanzania.



Dr. Lyabwene M. Mtahabwa
Commissioner for Education

ELECTRONICS SYLLABUS FOR ORDINARY SECONDARY EDUCATION
VOCATIONAL STREAM FORM I-IV

© Vocational Education and Training Authority, 2022
Published 2022

Revised 2025

Vocational Education and Training Authority (VETA)
12 VETA Road,
41104 Tambukareli,
P.O. Box 802,
Dodoma - Tanzania,
Telephone: +255 26 2963661
Website: www.veta.go.tz
Email: info@veta.go.tz

ISBN: 978-9912-750-28-9

This document should be cited as: Ministry of Education, Science and Technology. (2025). *Electronics syllabus for Ordinary Secondary Education Vocational Stream Form I–IV*. Vocational Education and Training Authority.

All rights reserved. No part of this syllabus may be reproduced, stored in any retrieval system or transmitted in any form or by any means whether electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the Vocational Education and Training Authority

Table of Contents

List of Tables	iii
Abbreviations and Acronyms	iv
Definition of Key Terms	v
Acknowledgements.....	vi
1.0 Introduction.....	1
2.0 Main Objectives of Education in Tanzania.....	1
3.0 General Competencies for Ordinary Secondary Education Vocational Stream	2
4.0 General Competences of the Occupation.....	2
5.0 Main and Specific Competences	2
6.0 The Roles of Teachers, Students and Parents in Teaching and Learning	4
6.1 The teacher.....	4
6.2 The student.....	4
6.3 The parent/guardian	5
7.0 Teaching and Learning Methods	5
8.0 Teaching and Learning Resources.....	5
9.0 Assessment.....	5
9.1 Project work	6
10.0 Number of Periods	6
11.0 Teaching and Learning Contents	7
Bibliography	325

List of Tables

Table 1: Main and Specific Competences for Form I–IV	2
Table 2: Contribution of Continuous Assessment and National Examination to the Final Score	6
Table 3: Detailed contents for Form One.....	8
Table 4: Detailed Contents for Form Two	54
Table 5: Detailed Contents for Form Three	126
Table 6: Detailed Contents for Form Four.....	216

Abbreviations and Acronyms

AC	Alternating Current
AM	Amplitude Modulation
CCTV	Closed-Circuit Television
CODEC	Encoder/ Decoder
DC	Direct Current
DVD	Digital Video Disc
FM	Frequency Modulation
MODEM	Modulator/Demodulator
NECTA	National Examinations Council of Tanzania
OP AMP	Operational Amplifier
PA	Public Address
PC	Personal Computer
RLC	Resistance Inductance Capacitance
TV	Television
UPS	Uninterruptible Power Supply
VCD	Video Compact Disc
VCR	Video Cassette Recorder
VET	Vocational Education and Training
VETA	Vocational Education and Training Authority

Definition of Key Terms

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

Circumstantial knowledge: Detailed knowledge that allows decision-making regarding different circumstances and cross-cutting issues.

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

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

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

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

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

Acknowledgements

The writing of the *Electronics Syllabus for Ordinary Secondary Education Vocational Stream Form I–IV* was a collaborative effort involving the dedication and expertise of a wide range of organisations and individuals. The Vocational Education and Training Authority (VETA) would like to thank all the organisations and experts who contributed to the development of this Syllabus.

VETA appreciates the expertise of individuals, their time, effort, and resources devoted to this important task. Their contributions have been crucial in developing a syllabus that is both relevant and comprehensive, aimed at equipping students with the skills necessary for success in their fields.

Furthermore, VETA acknowledge the valuable inputs from employers in both the formal and informal sectors during labour market surveys.

Likewise, VETA thanks the Ministry of Education, Science and Technology in a special way for facilitating the preparation, printing and distribution of this syllabus

For and on behalf of:

Vocational Education and Training Authority



CPA. Anthony M. Kasore

Director General

1.0 Introduction

Electronics is one of the occupations taught in the Ordinary Secondary Education Vocational Stream. Learning electronics is essential because Tanzania has a growing demand for electronic devices and systems, driven by advancements in technology and the increasing need for modern infrastructure. The electronics sector offers significant opportunities for economic growth and technological development. By learning electronics, students gain practical skills that enable them to design, build, and repair electronic devices, such as household appliances, communication systems, and industrial equipment. This enhances local industries, reduces dependency on imported electronic products, and contributes to national self-reliance in technology. Ultimately, this fosters economic development, creates jobs, promotes technological innovation, and supports sustainable development.

Upon completion of the programme, students will possess both theoretical and practical knowledge of electronics, from component identification to advanced circuit design and system integration. They will be proficient in using electronic testing equipment, developing and maintaining electronic circuits, and implementing sustainable practices in the industry, all while adhering to safety and environmental standards. Additionally, students will gain business skills critical for managing an electronics enterprise, ensuring high standards of quality, innovation, and competitiveness in the electronics industry.

Graduates of this occupation can find employment in the following sectors:

They may work in both government and private sectors, including ministries, training institutions, research organisations, technology companies, telecommunications firms, hospitals, mobile phone companies, farming firms, and development projects. Employment opportunities also exist in self-employment, small, medium, and large electronics industries, and in Non-Governmental Organisations (NGOs).

The *Electronics Syllabus* is designed to guide the teaching and learning of Electronics at the 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 electronics. It contains valuable information that will enable teachers to effectively plan their teaching process and help learners to develop the intended competences.

2.0 Main Objectives of Education in Tanzania

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

- (a) Develop and improve his or her personality so that he or she values himself or herself and develops self-confidence;
- (b) Respect the culture, traditions, norms, and customs of Tanzania; cultural differences; dignity; human rights; attitudes and inclusive actions;
- (c) Advance knowledge and apply science and technology, creativity, critical thinking, innovation, cooperation, communication, and positive attitudes for his or her 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 society, gender equality, as well as the management and sustainable conservation of the environment; and
 - (h) Develop national and international cooperation, peace, and justice per the Constitution of the United Republic of Tanzania and international conventions.

3.0 General Competencies for Ordinary Secondary Education Vocational Stream

The general competences for Ordinary Secondary Education, Form 1–IV, Vocational Education Stream are to:

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

4.0 General Competences of the Occupation

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

- (a) Test and troubleshoot electronic devices and systems;
- (b) Design and construct circuits;
- (c) Service and repair equipment;
- (d) Maintain awareness of safety and health;
- (e) Manage activities in the electronics industry; and
- (f) Maintain tools, equipment and machines.

5.0 Main and Specific Competences

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

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

Modules (Main Competence)	Units (Specific competences)
1.0 Maintaining safety of workshop and	1.1 Maintaining workshop safety 1.2 Handling accidents and incidents

Modules (Main Competence)	Units (Specific competences)
surroundings	1.3 Handling fire accidents 1.4 Performing First Aid
2.0 Performing preventive maintenance of tools, equipment and machines	2.1 Performing preventive maintenance of electrical tools 2.2 Performing preventive maintenance of electrical equipment 2.3 Maintaining machine
3.0 Performing bench work	3.1 Performing cutting 3.2 Performing filing 3.3 Performing drilling 3.4 Performing riveting 3.5 Performing threading 3.6 Performing metal forming
4.0 Performing electrical joints.	4.1 Performing cold electrical joints 4.2 Performing soldering
5.0 Building simple electric circuits	5.1 Constructing resistive circuits 5.2 Constructing capacitive circuits 5.3 Constructing inductive circuits 5.4 Constructing resistor inductor and capacitor (RLC) circuits 5.5 Measuring electric quantities
6.0 Building simple electronic circuits	6.1 Determine characteristics of active electronic devices. 6.2 Building rectifier circuits 6.3 Servicing batteries 6.4 Constructing low/high frequency circuits 6.5 Troubleshooting analogue electronic circuits
7.0 Operating test equipment	7.1 Using signal generator 7.2 Using frequency meter 7.1 Using of oscilloscope
8.0 Servicing audio equipment	7.2 Servicing AM and FM radio receiver 7.3 Troubleshooting tape recorder, compact disc and record player 7.4 Servicing public address (PA) and music systems
9.0 Testing digital electronic systems	9.1 Constructing simple digital circuits 9.2 Measuring parameters of digital circuits 9.3 Determining responses of logic gates
10.0 Servicing video equipment	10.1 Servicing television receivers 10.2 Installing television receiver antennas 10.3 Servicing video cassette recorders (VCRs) 10.4 Servicing video cameras 10.5 Servicing video compact disc (VCD) and digital video disc (DVD) 10.6 Installing closed circuit television systems 10.7 Servicing smart TVs
11.0 Building IC circuits	11.1 Constructing operational amplifier (OP AMP) circuits 11.2 Constructing integrated amplifier circuits
12.0 Performing basic maintenance of mobile phone	12.1 Carrying out basic diagnosis of mobile phones 12.2 Performing basic mobile phone troubleshooting
13.0 Servicing personal computers	13.1 Operating personal computers 13.2 Servicing computer hardware 13.3 Installing computer peripherals 13.4 Installing software
14.0 Servicing data communication Systems	14.1 Installing Voice, Fax Data Modems 14.2 Troubleshoot Data Communication Equipment
15.0 Servicing power backup equipment	15.1 Installing uninterruptible power supply (UPS) 15.2 Installing solar cell modules 15.3 Servicing storage batteries
16.0 Managing workshop activities	16.1 Designing workshop layout 16.2 Controlling tools and equipment

Modules (Main Competence)	Units (Specific competences)
	16.3 Estimating materials and labour costs 16.4 Training subordinates 16.5 Preparing reports 16.6 Managing workshop business
17.0 Managing Safe Work Environment	17.1 Managing hazards 17.2 Carrying out risk assessments 17.3 Managing the environment
18.0 Managing Preventive Maintenance	18.1 Planning preventive maintenance 18.2 Supervising preventive maintenance

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

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

6.1 The teacher

The teacher is expected to:

- (a) Help the student to learn and develop the intended competences in Electronics;
- (b) Use teaching and learning approaches that will allow students with different needs and abilities to:
 - (i) Develop the competences needed in the 21st Century; and
 - (ii) Actively participate in the teaching and learning process
- (c) Use student-centred instructional strategies that make the student the centre of learning and 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 that 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 community at large in the student's learning process; and
- (l) Integrate cross-cutting issues and ICT in the teaching and learning process.

6.2 The student

The student is expected to:

- (a) Develop the intended competences by participating actively in various

- learning activities inside and outside the classroom; and
- (b) Participate in the search for knowledge from various sources, including textbooks, reference books and other publications in online libraries

6.3 The parent/guardian

The Parents/Guardian is expected to:

- (a) Monitor the child's academic progress;
- (b) Where possible, provide the child with the needed academic support;
- (c) Provide the child with a safe and friendly home environment conducive to learning;
- (d) Keep track of a child's progress in behaviour;
- (e) Provide the child with any necessary materials required in the learning process; and
- (f) Instill in the 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 students' competences. This Syllabus suggests teaching and learning methods for each activity which include but not limited to demonstrations, practical/hands-on activities, observations, role play, simulation, group work, peer teaching/learning, discussions, presentations, field visits, research, and project works. However, a teacher is advised to plan and use other appropriate methods based on the environment or context. All the teaching and learning methods should be integrated with the everyday lives of students. The focus is expected to be on practical application and developing cognitive, affective, and psychomotor skills through learner-centred methods. Vocational teachers act as facilitators, incorporating both school-based teaching and project work supervision.

8.0 Teaching and Learning Resources

The process of teaching and learning requires different resources. In that regard, both teachers 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 continually seek information from various sources to effectively facilitate the teaching and learning process. The list of approved textbooks and reference books shall be provided by the Tanzania Institute of Education (TIE).

9.0 Assessment

Assessment is important in the teaching and learning of Electronics. It is divided into formative and summative assessments. Formative assessment informs both the teacher and students about the progress of teaching and learning, and helps in making decisions to improve the teaching and learning process. Teachers are, therefore, expected to use a wide range of formative assessment methods which include, but are not limited to,

demonstration, discussions, presentations, oral questions, experiments, observations, practical assignments and projects.

Summative assessment, on the other hand, will focus on determining students' achievements of learning. Teachers are expected to use a variety of summative assessments, including the Form Two National Assessment, terminal examinations, annual examinations, mock examinations and project. The scores obtained from these assessments will contribute to Continuous Assessment (CA). Therefore, the Continuous Assessments shall account for 60% of the final score, and the National Form IV Examination will contribute 40%, as indicated in Table 2.

Table 2: *Contribution of Continuous Assessment and National Examination to the Final Score*

Assessment Category	Weight (%)	National Examination (%)
Form Two National Assessment (FTNA)	6.0	40.0
Form Three Terminal Examination	5.0	
Form Three Annual Examination	5.0	
Form Four Mock Examination	7.0	
Project	7.0	
Form Two Practical	10.0	
Form Three Practical	10.0	
Form Four Practical	10.0	
Total	60.0	

9.1 Project work

Project work is a carefully planned and clearly defined task or problem that a student undertakes, either alone or in a group, to enhance and apply the skills and knowledge gained in the classroom, workshop, 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 align with the guidelines provided by the National Examinations Council of Tanzania (NECTA).

10.0 Number of Periods

The Electronics 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 periods of 40 minutes each have been allocated per week, whereby two periods will be used for theory and six for practical sessions, which may require double periods (e.g., 80 minutes). Double periods allow sufficient time for hands-on activities.

11.0 Teaching and Learning Contents

The contents of the syllabus are organised into a matrix with seven columns, which include main competences, specific competences, learning activities, suggested teaching and learning methods, assessment criteria (divided into process assessment, products/service assessment, and underpinning knowledge), suggested teaching and learning resources, and the number of periods required, as presented in Tables 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	Services Assessment	Knowledge Assessment		
1.0 Maintaining safety of workshop and surroundings	1.1 Maintaining Workshop Safety	(a) Maintaining workshop safety rules	<p>Brainstorm: Guide the students to brainstorm key workshop safety rules, discuss their importance in preventing accidents and ensuring a safe working environment</p> <p>Demonstrations: Conduct a demonstration showing correct workshop safety practices, such as wearing personal protective equipment (PPE), handling tools safely, and maintaining proper posture when working with machinery.</p> <p>Role-Play: Assign students specific roles, such as safety officers, machine operators, or maintenance staff, and have them act out scenarios in which they</p>	<ul style="list-style-type: none"> Interpret different safety signs in a workshop Draw safety signs Maintain personal safety Clean workshop, tools, equipment and workshop surroundings Use safety gear 	Safety of workshop and tools maintained as per safety rules and regulations	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to:</p> <ul style="list-style-type: none"> adhere to the workshop safety rules prevent accident and ensuring safety while in workshop <p>Principles: The student should explain principles of:</p> <ul style="list-style-type: none"> Workshop safety Preventing accidents by observing safety rules <p>Theories: The student should explain: -</p> <ul style="list-style-type: none"> Workshop safety rules Purpose of each safety rule Different safety signs and their importance <p>Circumstantial</p>	<p>The following tools, equipment and safety gear are to be available:</p> <ul style="list-style-type: none"> Safety gear (PPE) Safety signs 	22

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>must follow or enforce safety rules</p> <p>Group Activity: Organise students into manageable groups and have them identify potential hazards in a hypothetical workshop setup. Each group should propose safety rules and procedures to address these hazards, such as proper tool storage, regular equipment inspections, or fire safety measures.</p>			<p>knowledge Detailed knowledge about:</p> <ul style="list-style-type: none"> • OSHA rules and regulations • Safe working practices • Workshop rules and regulations 		
		(b) Maintaining workshop working environment	<p>Brainstorm: Guide students to identify the main aspects of a safe and effective workshop environment and discuss how these factors contribute to productivity and safety</p> <p>Digital Simulations: Use virtual simulations or apps that simulate workshop environments where students identify clutter, unsafe</p>	<ul style="list-style-type: none"> • Maintain workshop safety • Identify causes of health and safety hazards in a workshop and its surroundings • Maintain a safe working environment • Maintain personal safety 	Safety of workshop and tools maintained as per safety rules and regulations	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to:</p> <ul style="list-style-type: none"> • Maintain workshop safety • Dispose of different types of waste • Clean workshop, tools, equipment and machines safely • Maintain personal safety while in the workshop 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Tool kit • Spirit level • Safety boots • Gloves • Overalls • Cleaning materials • Hoe • Broom • Brush 	21

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>conditions, or improper tool storage.</p> <p>Group Activity: Organise students into manageable groups and have them organise tools, clean the workshop, and check the functionality of safety equipment.</p>	<ul style="list-style-type: none"> • Clean workshop, tools, equipment and workshop surroundings • Store tools, equipment and safety gear • Dispose of different types of waste as per OHS 		<p>Principles: The student should explain principles of:</p> <ul style="list-style-type: none"> • Workshop cleaning • Storing different types of tools and equipment used in the occupation <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Possible workshop accidents and their causes and prevention • Methods of disposing of different types of waste • Classification of wastes and their hazards • Importance of cleaning a workshop and its surroundings • Purpose of each safety gear • Different safety signs and their importance <p>Circumstantial knowledge Detailed knowledge about:</p>	<ul style="list-style-type: none"> • Safety gear (PPE) • Dust covers • Dust mask • Dust bins • Computer • Virtual reality devices 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						<ul style="list-style-type: none"> • OSHA rules and regulations • Safe working practices • Waste disposal procedures • Workshop rules and regulations 		
		(c) Maintaining personal safety	<p>Brainstorm: Guide students to define personal safety and identify common risks in a workshop environment</p> <p>Demonstrations: Demonstrate the correct use of personal protective equipment (PPE), such as gloves, safety goggles, and helmets, and how to handle tools safely.</p> <p>Role Play and Scenario: Organise students into pairs and have them act out scenarios where personal safety is at risk (e.g., handling chemicals without gloves, working in a cluttered area) and</p>	<ul style="list-style-type: none"> • Select relevant safety gear • Identify causes of health and safety hazards in a workshop and its surroundings • Take precautions against health and safety hazards • Interpret different safety signs in a workshop • Maintain personal safety • Use safety gear 	Safety of workshop and tools maintained according to safety rules and regulations	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to:</p> <ul style="list-style-type: none"> • Maintain personal safety while in workshop <p>Principles: The student should explain principles of:</p> <ul style="list-style-type: none"> • personal safety • Using safety gear (PPE) <p>Theories: The student should explain: -</p> <ul style="list-style-type: none"> • Purpose of each safety gear • Different safety sign and their importance <p>Circumstantial knowledge Detailed knowledge about:</p>	<p>The following tools, equipment and safety gear are to be available:</p> <ul style="list-style-type: none"> - • Tool kit • Spirit level • Safety boots • Gloves • Overalls • Cleaning materials • Safety gear (PPE) • Dust covers • Dust mask 	21

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>practice implementing safety measures.</p> <p>Safety Checklists and Inspections Provide students with safety checklists and have them inspect their personal workspace or the classroom for hazards.</p>			<ul style="list-style-type: none"> • OSHA rules and regulations • Safe working practices • Workshop rules and regulations 		
	1.2 Handling accidents and incidents	(a) Handling mechanical hazards	<p>Brainstorm: Guide the students to define mechanical hazards, identify examples of mechanical hazards and discuss their potential risks in various environments</p> <p>Demonstrations: Show students how to properly use tools and machines while highlighting potential hazards (e.g., loose clothing near rotating parts or improper tool handling).</p> <p>Role-Playing and Scenarios: Organise students into</p>	<ul style="list-style-type: none"> • Carry out first aid for a persons involved in accidents related to mechanical hazards • Use the service manual • Interpret workshop rules and regulations • React correctly and safely when faced with an emergency • Identify and apply all 	Machines, equipment accidents and incidents handled according to workshop rules and regulations	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to:</p> <ul style="list-style-type: none"> • Identify hazardous materials • Handle hazardous materials • Use safety gear • Use colour codes and safety signs • Handle an accident victim • Protect an unconscious victim • Carry out first aid • React correctly and safely when faced with an emergency <p>Principles: The student should explain</p>	The following tools, equipment and safety gear are be available: - <ul style="list-style-type: none"> • Tool kit • Air blower • Soft cloth • Fire extinguisher • brush • Overalls • Rubber gloves • Gloves • Safety boots • Safety clear glasses • First aid kit • First aid poster • Helmet 	13

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			manageable groups and create scenarios where students role-play responses to mechanical hazards, such as managing tool malfunctions or handling sharp objects safely.	<p>emergency equipment and supplies</p> <ul style="list-style-type: none"> • Locate first aid kit • Take necessary steps to save the victim • Report to superiors • Record accidents • Make periodic inspections of the workshop area and equipment • Handle mechanical equipment • Follow compressed air rules • Follow good environmental practices • Handle machines • Use safety gear • Clean tools, equipment 		<p>the principles of:</p> <ul style="list-style-type: none"> • Classification of hazards • Cardiopulmonary resuscitation • Emergency life support <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Effects of mechanical hazards • Emergency life support • Treatment for burns • Treatment for fractures • Treatment for an unconscious victim • Importance of using safety gear • Advantages of accidents preventions • Usage of colour codes and safety signs • Reading manufacturer's instruction before operating machine <p>Circumstantial Knowledge Detailed knowledge about:</p>	<ul style="list-style-type: none"> • Gloves • Ear plug • Mask • overall • Workshop rules and regulations guidelines • Service manual 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
				and workplace • Store tools and equipment		<ul style="list-style-type: none"> • Safety precautions while handling accidents and incidents • Safe handling of tools, equipment and machines • Waste disposal methods • Respiratory and circulatory systems • Basic functions of the human body 		
		(b) Handling Physical hazards	<p>Brainstorm: Guide students to define physical hazards and identify common examples, such as slippery floors, falling objects, noise, extreme temperatures, and sharp edges. Discuss how these hazards occur and their potential impact on safety</p> <p>Demonstrations: Demonstrate common physical hazards (e.g., lifting heavy objects, slippery floors, or sharp edges) and proper</p>	<ul style="list-style-type: none"> • Carry out first aid to a person involved in accidents related to physical hazards • Use service manual • Interpret workshop rules and regulations • React correctly and safely when faced with an emergency • Identify and 	Machines, equipment and chemicals accidents and incidents handled according to workshop rules and regulations	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to:</p> <ul style="list-style-type: none"> • Identify hazardous materials • Handle hazardous materials • Use safety gear • Use colour code and safety signs • Handle an accident victim • Protect an unconscious victim • Carry out first aid • React correctly and safely when faced with an emergency 	<p>The following tools, equipment and safety gear are to be available:</p> <ul style="list-style-type: none"> - • Soft cloth • brush • Overalls • Rubber gloves • Gloves • Safety boots • Safety clear glasses • First aid kit • First aid poster • Helmet 	12

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>techniques to mitigate risks, like correct lifting postures or using safety mats.</p> <p>Role-Playing Scenarios: Create real-life scenarios where students act out identifying and managing physical hazards, such as responding to a spill or ensuring a safe pathway in crowded areas.</p>	<p>apply all emergency equipment and supplies</p> <ul style="list-style-type: none"> • Locate first aid kit • Carry out artificial respiration • Take necessary steps to save the victim • Report to superiors • Record accidents • Make periodic inspections of the workshop area and equipment • Follow good environmental practices • Use safety gear • Clean tools, equipment and workplace • Store tools and 		<p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Classification of hazards • Handling hazardous materials • Identifying hazardous materials • Cardio pulmonary resuscitation • Emergency life support <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Effects of physical hazards • Emergency life support • Treatment of electric shock • Treatment of burns • Treatment of fractures • Treatment of unconscious person • Importance of using safety gear • Advantages of accident prevention • Usage of colour codes and safety signs 	<ul style="list-style-type: none"> • Gloves • Ear plug • Mask • overall • Workshop rules and regulations guidelines • Service manual 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
				equipment		<ul style="list-style-type: none"> Reading manufacturer's instructions before operating the machine Circumstantial knowledge Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions while handling accidents and incidents Safe handling of tools, equipment and machines Waste disposal methods Respiratory and circulatory systems Basic functions of the human body 		
		(c) Handling chemical hazards	Brainstorm: Guide students to define and identify examples of chemicals. Discuss how these hazards occur and their potential effects on health and safety Practical Demonstration:	<ul style="list-style-type: none"> Carry out first aid on persons involved in accidents related to chemical hazards Use service manual Interpret workshop 	Machines, equipment and chemicals accidents and incidents handled according to workshop rules and regulations	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: <ul style="list-style-type: none"> Identify hazardous materials Handle hazardous materials Use safety gear Use colour codes 	The following tools, equipment and safety gear are to be available: - <ul style="list-style-type: none"> Soft cloth Fire extinguisher brush Overalls 	13

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>Guide students to properly handle, label, and store common chemicals using clear, step-by-step instructions. Include examples of dangerous mistakes, such as mixing incompatible substances.</p> <p>Digital Simulations: Use simulations to allow students practice mixing chemicals safely or identify unsafe practices without real-world risks.</p> <p>Activity: Organise students into manageable groups to handle a simulated chemical hazard, such as cleaning up a spill or evacuating safely.</p>	<p>rules and regulations</p> <ul style="list-style-type: none"> • React correctly and safely when faced with an emergency • Identify and apply all emergency equipment and supplies • Locate first aid kit • Carry out artificial respiration • Take necessary steps to save the victim • Report to superiors • Record accidents • Make periodic inspections of the workshop area and equipment • Identify hazardous material 		<p>and safety signs</p> <ul style="list-style-type: none"> • Handle an accident victim • Protect an unconscious victim • Carry out first aid • React correctly and safely when faced with an emergency <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Classification of hazards • Handling hazardous materials • Identifying hazardous materials • Cardiopulmonary resuscitation • Emergency life support <p>Theories: The student should explain: -</p> <ul style="list-style-type: none"> • Effects of chemical hazards • Emergency life support • Treatment for burns • Treatment for unconscious persons • Importance of using safety gear 	<ul style="list-style-type: none"> • Rubber gloves • Gloves • Safety boots • Safety clear glasses • First aid kit • First aid poster • Gloves • Mask • overall • Workshop rules and regulations guidelines • Service manual • Computer • Projector 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
				<ul style="list-style-type: none"> • Handle hazardous material • Follow good environmental practices • Use safety gear • Clean tools, equipment and workplace • Store tools and equipment 		<ul style="list-style-type: none"> • Advantages of accidents preventions • Usage of colour code and safety signs • Reading manufacturer's instructions before operating machines <p>Circumstantial knowledge Detailed knowledge about:</p> <ul style="list-style-type: none"> • Safety precautions while handling accidents and incidents • Waste disposal methods • Respiratory and circulatory systems • Basic functions of the human body 		
		(d) Handling electrical hazards	<p>Brainstorm: Guide students to define and identify examples of electrical hazards. Discuss the potential risks of electrical hazards</p> <p>Demonstrations: Show students how to</p>	<ul style="list-style-type: none"> • Carry out first aid on persons involved in accidents related to electrical hazards • Use service manual 	Machines and equipment accidents and incidents handled according to workshop rules and regulations	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to:</p> <ul style="list-style-type: none"> • Use safety gear • Use colour codes and safety signs • Handle an accident 	The following tools, equipment and safety gear are to be available: - • Tool kit • Soft cloth • Fire	13

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>handle electrical equipment safely, including turning off the main power switch before working on electrical devices or inspecting cables for wear and tear.</p> <p>Activity: Organise students into manageable groups to identify potential electrical hazards in the workshop or school premises. Assign them to assess the risks and suggest preventive measures</p> <p>Discussion: Facilitate a discussion on the importance of electrical safety and compliance with safety standards. Use real-life examples of electrical accidents to highlight the consequences of negligence and improper practices</p>	<ul style="list-style-type: none"> • Interpret workshop rules and regulations • React correctly and safely when faced with an emergency • Identify and apply all emergency equipment and supplies • Locate first aid kit • Carry out artificial respiration • Take necessary steps to save the victim • Report to superiors • Record accidents • Make periodic inspections of workshop area and equipment • Identify 		<p>victim</p> <ul style="list-style-type: none"> • Protect an unconscious victim • Protect a fire victim • Carry out first aid • React correctly and safely when faced with an emergency <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Cardiopulmonary resuscitation • Emergency life support <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Emergency life support • Treatment electric shock • Treatment for burns • Treatment for unconscious person • Importance of using safety gear • Advantages of accidents preventions • Usage of colour codes and safety signs • Reading 	<p>extinguisher</p> <ul style="list-style-type: none"> • Overalls • Rubber gloves • Gloves • Safety boots • Safety clear glasses • First aid kit • First aid poster • Gloves • overall • Workshop rules and regulations guidelines • Service manual 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
				hazardous materials <ul style="list-style-type: none"> • Use colour codes and know what colour represent • Handle electrical equipment • Follow good environmental practices • Use safety gear • Store tools and equipment 		manufacturer's instructions before operating machines Circumstantial knowledge Detailed knowledge about: <ul style="list-style-type: none"> • Safety precautions while handling accidents and incidents • Safe handling of tools, equipment and machines • Waste disposal methods • Respiratory and circulatory systems • Basic functions of the human body 		
		(e) Maintaining safety gear	Brainstorm: Guide the students to define safety gears and their importance in preventing injuries in workshops and industrial environments. Discuss the various types of safety gear and their functions. Practical Work: Guide students to properly inspect, clean,	<ul style="list-style-type: none"> • Use service manual • Clean tools, equipment and workplace • Store tools and equipment 	Machines, equipment and chemicals accidents and incidents handled according to workshop rules and regulations	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: <ul style="list-style-type: none"> • Use safety gear • Use colour codes and safety signs Principles: The student should explain the principles of: <ul style="list-style-type: none"> • Classification of hazards 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Overalls • Rubber gloves • Gloves • Safety boots • Safety glasses 	12

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>and store safety gears to ensure their effectiveness and longevity</p> <p>Safety Gear Checklist: Develop a safety gear maintenance checklist that students use to inspect and evaluate the condition of their PPE.</p> <p>Role-Play: Organise students into manageable groups and create scenarios where students are required to handle safety gear in the context of real situations, such as preparing for a field trip or workshop session. Have them inspect, clean, and wear the equipment correctly.</p>			<ul style="list-style-type: none"> Handling safety gear Storing safety gear <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> Importance of using safety gear Advantages of accidents preventions Usage of colour code and safety signs Reading manufacturer's instructions before operating machines <p>Circumstantial knowledge Detailed knowledge about:</p> <ul style="list-style-type: none"> Safety precautions while handling accidents and incidents Safe handling of tools, equipment and machines 	<ul style="list-style-type: none"> Helmet Ear plugs Mask Workshop rules and regulations guidelines Service manual 	
	1.3 Handling Fire Accidents	(a) Handling firefighting equipment and materials	Brainstorm: Guide the students to define firefighting equipment and materials. Discuss their importance in	<ul style="list-style-type: none"> Select tools, equipment and safety gear Apply right class of fire 	Fire accidents handled as per rules and regulations	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to:	The following tools, equipment and safety gear are to be available: -	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	Knowledge Assessment		
			<p>preventing the spread of fire and ensuring safety</p> <p>Demonstrations: Guide the students to use basic firefighting equipment, such as fire extinguishers, fire blankets, and hose reels.</p> <p>Fire Safety Simulation: Set up a mock fire scenario in a controlled environment (e.g., a small fire in a pan or using smoke machines). Guide students in choosing and using the correct firefighting equipment for different fire types (e.g., electrical, oil, or wood fires).</p> <p>Firefighting Drill Practice: Organise a fire drill where students practice evacuating the building and using firefighting equipment in real time. Include specific tasks like checking for fire</p>	<p>extinguisher</p> <ul style="list-style-type: none"> • Check and test fire extinguishers • Clean up tools, equipment and working place • Store tools, equipment and safety gear 		<ul style="list-style-type: none"> • Identify different type of fire extinguishers • Apply the correct type of fire extinguishers • Apply the correct type of firefighting materials <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Identifying different types of fire extinguishers • Checking and testing fire extinguishers • Applying the right class of fire extinguishers <p>Theories: The student should explain: -</p> <ul style="list-style-type: none"> • Importance of handling fire accidents • Types and common classes of fire • Handle different types of fire • Importance of checking and servicing fire 	<ul style="list-style-type: none"> • Firefighting rules and regulations • Workshop rules and regulations • Fire extinguishers • Firefighting materials • First aid kit • Gloves • Safety boots • Overall • Safety clear glasses 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			safety gear, operating extinguishers, and identifying fire exits.			extinguishers <ul style="list-style-type: none"> Importance of differentiating firefighting materials 		
		(b) Handling different types of fire	Brainstorm: Guide the students to define fire classes and identify their causes. Discuss the dangers of using incorrect firefighting methods for each fire type Demonstrations: Demonstrate the appropriate firefighting equipment for each class of fire, explaining why certain tools are more effective for specific types of fires. Fire Safety Simulation: Use virtual reality (VR) or fire safety simulation software to create realistic fire scenarios, or conduct controlled physical simulations of fire outbreaks. Hands-On Practice:	<ul style="list-style-type: none"> Identify common classes of fire React correctly and safely when faced with different types of fire Handle different types of fire Apply the correct class of firefighting materials 	Fire accidents handled as per rules and regulations	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: <ul style="list-style-type: none"> Identify different types of fire extinguishers Apply the correct type of fire extinguishers Apply the correct type of firefighting materials Principles: The student should explain the principles of: <ul style="list-style-type: none"> Identifying different types of fire extinguishers Checking and testing fire extinguishers Applying the correct class of fire extinguishers Theories: The student	The following tools, equipment and safety gear are to be available: <ul style="list-style-type: none"> Firefighting rules and regulations Workshop rules and regulations Fire extinguishers Firefighting materials First aid kit Gloves Safety boots Overall Safety clear glasses Computer Virtual reality gadgets 	36

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			Organise the students into manageable groups to simulate handling different fire scenarios. Set up controlled fire scenarios using fire simulators or safe mock setups (such as controlled propane fires or fire simulator boxes). Let students practice using the correct fire extinguishers for each fire class			should explain: <ul style="list-style-type: none"> • Importance of handling fire accidents • Types and common classes of fire • Handle different types of fire • Importance of checking and servicing fire extinguishers • Importance of differentiate firefighting materials 		
	1.4 Performing First Aid	(c) Performing artificial respiration	Brainstorm: Guide students to define artificial respiration and its purpose in emergencies, such as when a person has stopped breathing. Discuss the importance of acting quickly and correctly to save lives CPR Demonstration with Videos: Show instructional videos of CPR and artificial respiration, highlighting key techniques such as the	<ul style="list-style-type: none"> • Select tools and equipment • Perform artificial respiration • Observe safety precautions. 	First aid offered conforms to medical requirements.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to perform first aid Principles: The student should explain principles of: - <ul style="list-style-type: none"> • Performing artificial respiration • Providing first aid Theories: The student should explain: - <ul style="list-style-type: none"> • Different types of accidents 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • First aid Kit • Stretcher • Light blanket • Sterilizer. • Towel • Overall • Medical gloves • Safety boots • Mannequins 	36

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>correct positioning of the airway, the amount of air to be blown into the patient, and proper chest compression depth</p> <p>Practical Demonstration: Guide students to properly perform artificial respiration.</p> <p>Hands-On Practice with Mannequins: Organise students into pairs to practice artificial respiration on mannequins or CPR training dolls. Ensure they follow the correct steps for assessing the victim and performing resuscitation</p> <p>Discussion: Facilitate a discussion on when artificial respiration should be performed and when to seek professional medical assistance. Guide them to share</p>			<ul style="list-style-type: none"> • Types of artificial respiration • The use of accessories in a first aid kit. • Importance of first aid <p>Circumstantial knowledge Detailed knowledge about:</p> <ul style="list-style-type: none"> • Safety precautions to be observed while performing first aid • Safe handling of first aid kit. 	<ul style="list-style-type: none"> • CPR training doll 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			case studies or real-life experiences to highlight the importance of this skill.					
		(d) Performing first aid on minor wound scalpels	<p>Brainstorm: Guide students to define minor wounds, specifically scalpel injuries, and discuss their causes. Highlight the importance of treating these injuries promptly to prevent infection and further harm</p> <p>Demonstration: Demonstrate the proper steps to treat a minor scalpel wound, highlighting key techniques by using a manikin and first aid kit.</p> <p>Hands-On Practice: Organise students into manageable groups to practice first aid on minor wound scenarios using props like bandages, gauze, and dummies. Have them</p>	<ul style="list-style-type: none"> • Select tools and equipment • Identify types of injuries • Attend minor wounds • Sterilise first aid tools • Observe safety precautions • Store first aid kit. 	First aid offered should conform to medical requirements.	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to perform first aid Principles: The student should explain principles of: -</p> <ul style="list-style-type: none"> • Attending minor wounds • Providing first aid <p>Theories: The student should explain: -</p> <ul style="list-style-type: none"> • Different types of wounds • Different types of accidents • Types of artificial respiration • The use of accessories in a first aid kit. • Importance of first aid <p>Circumstantial knowledge Detailed knowledge</p>	<p>The following tools, equipment and safety gear are to be available: -</p> <ul style="list-style-type: none"> • First aid Kit • Stretcher • Light blanket • Sterilizer. • Towel • Overall • Medical gloves • Safety boots. • Mankin 	30

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			demonstrate each step, ensuring correct technique and hygiene			about: <ul style="list-style-type: none"> • Safety precautions to be observed while performing first aid • Safe handling of first aid kit • Waste disposal 		
2.0 Performing Preventive Maintenance of Tools & Equipment	2.1 Performing Preventive Maintenance of Electrical Tools	(a) Maintaining Workshop safety Gear	Brainstorm: Guide students to identify workshop safety gear and discuss the importance of each item in maintaining safety and preventing injuries in the workshop environment Practical Work: Guide students to properly maintain and inspect safety gear. Hands-On Practice: Organise students into manageable groups to inspect the workshop for the condition of safety gear. Ask them to identify any damaged or improperly stored equipment and suggest corrective actions. Have them practice cleaning	<ul style="list-style-type: none"> • Select tools • Interpret maintenance schedule chart • Identify faults • Observe safety precautions • Clean tools, equipment, machine and workplace • Store tools and equipment. 	Maintained equipment/machine functions as per the manufacturer's specifications.	Knowledge evidence: <ul style="list-style-type: none"> • Detailed Knowledge of: Method used: The student should explain different ways of maintaining tools Principles: The student should explain principles of maintaining tools Theories: The student should explain: <ul style="list-style-type: none"> • Preventive maintenance • Corrective maintenance • Importance of maintenance schedule • Preparation of warning tags Circumstantial knowledge Detailed knowledge about: 	The following tools, safety gear and equipment are to be available: <ul style="list-style-type: none"> - • Assorted power operated hand tools • Assorted automatic tool kits • Maintenance schedule chart • Waste bin • Blower • Sprit can • Safety clear glasses • Gloves • Over Coat 	22

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			and maintaining a piece of safety gear, such as goggles or gloves.			<ul style="list-style-type: none"> • Safety precautions to be observed while maintaining equipment/machines • Safe handling of tools and equipment • Waste disposal. 		
		(b) Maintaining electrical hand tools	<p>Brainstorm: Guide students to identify and discuss the importance of proper maintenance of common electrical hand tools used in the workshop.</p> <p>Practical Work: Step by step guide the students to maintain electrical hand tools.</p> <p>Hands-On Tool Inspection: Organise students into manageable groups to perform a hands-on inspection and maintenance task on electrical hand tools. Ask them to use checklist to identify any damage, clean the tool, and check it for proper</p>	<ul style="list-style-type: none"> • Select tools • Interpret maintenance schedule chart • Identify faults • Observe safety precautions • Clean tools, equipment, machines and workplace • Store tools and equipment 	Maintained equipment/machine functions as per the manufacturer's specifications.	<p>Knowledge evidence: Detailed Knowledge of: Method used: The student should explain different ways of maintaining tools Principles: The student should explain principles of maintaining tools Theories: The student should explain:</p> <ul style="list-style-type: none"> • Preventive maintenance • Corrective maintenance • Importance of maintenance schedule • Preparation of warning tags <p>Circumstantial knowledge Detailed knowledge about:</p>	<p>The following tools, safety gear and equipment are to be available:</p> <ul style="list-style-type: none"> - • Assorted power operated hand tools • Assorted automatic tool kits • Maintenance schedule chart • Waste bin • Blower • Safety clear glasses • Gloves • Over Coat 	22

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			functionality. Encourage them to document their findings and actions taken during the maintenance process.			<ul style="list-style-type: none"> Safety precautions to be observed while maintaining equipment/machines Safe handling of tools and equipment. 		
		(c) Maintaining measuring tools	Brainstorm: Guide students to identify common measuring tools used in the workshop. Discuss the importance of maintaining these tools to ensure accuracy and reliability in measurements Practical Work: Guide the students to properly maintain measuring tools Activity: Organise students into manageable groups to inspect and maintain a variety of measuring tools. Have them check for wear, clean the tools, and ensure they are properly calibrated.	<ul style="list-style-type: none"> Select tools Interpret maintenance schedule chart Identify faults Observe safety precautions Clean tools, equipment, machines and workplace Store tools and equipment 	Maintained equipment/machine functions as per the manufacturer's specifications.	Knowledge evidence: Detailed Knowledge of: Method used: The student should explain different ways of maintaining tools Principles: The student should explain principles of maintaining tools Theories: The student should explain: <ul style="list-style-type: none"> Preventive maintenance Corrective maintenance Importance of maintenance schedule Preparation of warning tags Circumstantial knowledge Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions 	The following tools, safety gear and equipment are to be available: <ul style="list-style-type: none"> - Assorted power operated hand tools Assorted automatic tool kits Maintenance schedule chart Waste bin Blower Sprit can Safety clear glasses Gloves Over Coat 	22

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						to be observed while maintaining equipment/machines <ul style="list-style-type: none"> • Safe handling of tools and equipment • Waste disposal. 		
	2.2 Performing Preventive Maintenance of Electrical Equipment	(a) Maintaining Passive equipment	<p>Brainstorm: Guide students to define and identify examples of passive equipment. Discuss the role of passive equipment in the workshop and the importance of maintaining these items to ensure safety and longevity</p> <p>Practical Work: Guide the students to inspect and store passive equipment.</p> <p>Activity: Organise students into manageable groups to inspect and maintain different types of passive equipment in the workshop. Have them identify potential issues, clean the equipment, and ensure everything is securely</p>	<ul style="list-style-type: none"> • Select tools, equipment and safety gear • Categorize equipment • Identify equipment faults • Rectify faulty equipment • Observe safety precautions • Clean tools and equipment • Store tools and equipment 	Maintained equipment conforms to manufacturer's specifications	<p>Knowledge evidence: Detailed Knowledge of: Method used: The student should explain different ways of maintaining equipment Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Passive equipment <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Safety precautions of equipment • Types of maintenance • Types of equipment • Application of every piece of equipment in the workshop <p>Circumstantial knowledge Detailed knowledge about:</p> <ul style="list-style-type: none"> • Safety precautions 	The following tools, equipment and safety gear, are to be available: - <ul style="list-style-type: none"> • Tool racks • Cabinets • Tool boxes • Tool shelves • Work bench • Service manuals • Store ledgers • Assorted Equipment • Vice • Sprit can • Over-coat • Gloves • Safety clear glasses 	30

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			fastened or positioned correctly Maintenance Log and Record Keeping: Guide students to maintain a maintenance log for active equipment			to be observed while maintaining tools • Waste disposal		
		(b) Maintaining Active Equipment	Brainstorm: Guide students to define and identify examples of passive equipment. Discuss the role of passive equipment in the workshop and the importance of maintaining these items to ensure safety and longevity Practical Work: Guide the students to properly inspect active equipment before use. Hands on Activity: Organise students into manageable groups to inspect and maintain different types of active equipment in the workshop. Have them check the power source, verify electrical connections, look for	<ul style="list-style-type: none"> • Select tools, equipment and safety gear • Categorize equipment • Identify equipment faults • Rectify faulty equipment • Observe safety precautions • Clean tools and equipment • Store tools and equipment 	Maintained equipment conforms to manufacturer's specifications.	Knowledge evidence: Detailed Knowledge of: Method used: The student should explain different ways of maintaining equipment Principles: The student should explain the principles of: <ul style="list-style-type: none"> • Active equipment Theories: The student should explain: <ul style="list-style-type: none"> • Safety precautions of equipment • Types of maintenance • Types of equipment • Application of every piece of equipment in the workshop Circumstantial knowledge Detailed knowledge	The following tools, equipment and safety gear, are to be available: - <ul style="list-style-type: none"> • Tool racks • Cabinets • Tool boxes • Tool shelves • Work bench • Service manuals • Store ledgers • Assorted Equipment • Vice • Sprit can • Over-coat • Gloves • Safety clear glasses 	38

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			damages to any moving parts, lubricate moving parts, and clean the equipment. Maintenance Log and Record Keeping: Guide students to maintain a maintenance log for active equipment			about: <ul style="list-style-type: none">• Safety precautions to be observed while maintaining tools• Waste disposal		
	2.3 Maintaining Machine	(a) Maintaining power machines	Brainstorm: Guide students to define and identify examples of power machines. Discuss the role of power machines in the workshop and the importance of regular maintenance to ensure their efficiency, safety, and longevity Practical Work: Guide the students to perform a detailed inspection of power machines. Activity: Organise students into manageable groups to perform maintenance tasks on different types	<ul style="list-style-type: none"> • Interpret machine manual • Prepare maintenance schedule • Detect machine faults • Perform oiling • Grease machine • Sharpen cutting tools • Perform greasing • Clean working place • Dusting off machines 	All maintained machines and equipment conform to manufacturer specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain different ways of maintaining machine/equipment Principles: The student should explain the principle of performing maintenance to machines Theories: The student should explain: <ul style="list-style-type: none"> • Parts of machines and their maintenance • Types of maintenance in each machine part • The role of 	The following tools, safety gear, equipment are to be available: - <ul style="list-style-type: none"> • Powered machine • Air compressor • Lubricating equipment 	36

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			of power machines. Have them inspect, clean, lubricate, and check for necessary repairs.			lubricants in machines Circumstantial knowledge Detailed knowledge about: <ul style="list-style-type: none"> • Safety aspect related to machine maintenance • Environmental issues 		
		(b) Maintaining manual machines	Brainstorm: Guide students to define and identify examples of manual machines. Discuss the importance of maintaining these machines to ensure their safety, efficiency, and longevity Practical Work: Guide the students to properly inspect and replace worn or damaged manual machines. Activity: Organise students into manageable groups to inspect and maintain various manual machines in the	<ul style="list-style-type: none"> • The student should be able to: • Interpret machine manual • Prepare maintenance schedule • Detect machine faults • Perform oiling • Grease machine • Sharpen cutting tools • Perform greasing • Clean working place 	All maintained machines and equipment conform to manufacturer specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain different ways of maintaining machine/equipment Principles: The student should explain the principle of performing maintenance on machines Theories: The student should explain: <ul style="list-style-type: none"> • Parts of machines and their maintenance • Types of maintenance in each machine part 	The following tools, safety gear, equipment are to be available: - <ul style="list-style-type: none"> • Mechanical machine • Air compressor • Lubricating equipment 	30

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			workshop. Have each group identify any issues, clean the machine, lubricate moving parts, and ensure it is in good working order.	<ul style="list-style-type: none"> Dusting off machines 		<ul style="list-style-type: none"> The role of lubricants in machines Circumstantial knowledge Detailed knowledge about: <ul style="list-style-type: none"> Safety aspect related to machine maintenance Environmental issues 		
3.0 Performing Bench Work	3.1 Performing Cutting	(a) Performing straight sawing	Brainstorm: Guide students to define straight sawing and its importance in the workshop. Discuss the different types of saws used for straight sawing Demonstrating the Sawing Process: Demonstrate how to perform the straight sawing technique with various tools Hands-On Practice: Organise students into manageable groups to practice performing straight sawing on	<ul style="list-style-type: none"> Interpret drawings Select tools and equipment Take measurements Cut work piece Check for accuracy Observe safety precautions Clean tools, work piece and workplace Store tools, equipment and 	Pieces of material cut as per technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to cut work piece in different sizes Principles: The student should explain the principles of: <ul style="list-style-type: none"> Taking measurements Marking work piece Cutting process Theories: The student should explain: <ul style="list-style-type: none"> Different types of materials and their properties Application of 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Work bench Steel rule Scriber T-Square Vernier calliper Divider Micrometer Mallet Surface table/plate Ball pein hammer Anvil 	22

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			different materials (e.g., wood, plastic, or metal). Have them measure, mark, and saw the material, ensuring accuracy and proper technique	workplace		different cutting tools <ul style="list-style-type: none"> • Uses of cutting tools and equipment • Use of measuring tools Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> • Safety precautions while performing the cutting process • Safe handling of work tools and equipment • Waste disposal 	<ul style="list-style-type: none"> • 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 sawing	Brainstorm: Guide students to define angular sawing and explain its importance in tasks that require angled cuts. Discuss different tools used for angular sawing Practical Work: Guide the students to perform angular sawing using all the necessary steps and safety precautions	<ul style="list-style-type: none"> • Interpret drawings • Select tools and equipment • Take measurements • Cut work piece • Check for accuracy • Observe safety precautions 	Pieces of material cut as per technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to cut work piece in different sizes Principles: The student should explain the principles of: <ul style="list-style-type: none"> • Taking measurements • Marking work piece • Cutting process 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Work bench • Steel rule • Scriber • T-Square • Vernier calliper • Divider • Micrometer 	26

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			Group Project: Organise students into manageable groups and assign each group a project where students must create a simple structure or piece (e.g., a frame or box) that requires multiple angular cuts	<ul style="list-style-type: none"> • Clean tools, work piece and workplace • Store tools, equipment and workplace • 		Theories: The student should explain: <ul style="list-style-type: none"> • Different types of materials and their properties • Application of different cutting tools • Uses of cutting tools and equipment • Use of measuring tools Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> • Safety precautions while performing cutting process • Safe handling of work tools and equipment • Waste disposal 	<ul style="list-style-type: none"> • Mallet • Surface table/plate • Ball peen hammer • 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 	
		(c) Performing chiseling	Brainstorm: Guide students to define chiseling and explain its importance in shaping and refining materials. Discuss different types of chisels and their specific uses in various	<ul style="list-style-type: none"> • Interpret drawings • Select tools and equipment • Take measurements • Check for 	Pieces of material cut as per technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to cut work piece in different sizes Principles: The	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Work bench • Steel rule 	24

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>projects</p> <p>Demonstrating the Chiseling Technique: Guide the students to perform chiseling using all the necessary steps and safety precautions.</p> <p>Hands-On Practice: Organise students into manageable groups and have them practice chiseling on various materials (wood, stone, or metal), starting with simple tasks like creating notches or smoothing edges.</p>	<p>accuracy</p> <ul style="list-style-type: none"> • Observe safety precautions • Clean tools, work piece and workplace • Store tools, equipment and workplace • 		<p>student should explain the principles of:</p> <ul style="list-style-type: none"> • Taking measurements • Marking work piece • Chiseling process <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Different types of materials and their properties • Application of different chiseling tools • Uses of chiseling tools and equipment • Use of measuring tools <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> • Safety precautions while performing cutting process • Safe handling of work tools and equipment • Waste disposal 	<ul style="list-style-type: none"> • Scriber • T-Square • Vernier calliper • Divider • Micrometer • Mallet • Surface table/plate • Ball pein hammer • 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 	
	3.2 Performing Filing	(a) Performing flat filing	Brainstorm: Guide students to define	<ul style="list-style-type: none"> • Interpret drawings 	Filed/ground work piece conforms to	Knowledge evidence: Detailed knowledge	<ul style="list-style-type: none"> • . • The 	45

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>flat filing and explain its significance in smoothing and shaping materials.</p> <p>Demonstrating Filing Technique: Guide the students to use correct techniques in performing flat filing while adhering to safety precautions.</p> <p>Hands-On Practice: Organise students into manageable groups to practice flat filing on different materials, such as metal or wood. Have them file a specific surface or edge to remove imperfections and smooth the material, focusing on applying even pressure and maintaining a consistent filing technique</p>	<ul style="list-style-type: none"> • Select tools and equipment • Take measurements and marking • File work piece • Check accuracy • Observe safety precautions • Clean tools, work piece and workplace • Store tools, equipment and work piece 	technical specifications	<p>of: Method used: The student should explain how to:</p> <ul style="list-style-type: none"> • Mark work piece • File a work piece • Grind work piece <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Taking measurements • Marking work piece • Filing and grinding work piece <p>Theories: The student should:</p> <ul style="list-style-type: none"> • Identify different types of materials and their properties • Explain applications of different materials • Describe proper use of files and equipment <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> • Safety precautions pertaining to filing/grinding 	<p>following tools, equipment and safety gear should be available:</p> <ul style="list-style-type: none"> • Work bench • Set of files • File card • Try square • Steel rule • Centre punch • Scriber • Divider • Hacksaw • Overall • Gloves • Safety clear glasses • Safety boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						<ul style="list-style-type: none"> Safe handling of working tools and equipment Waste disposal 		
		(b) Performing radii filing	<p>Brainstorm: Introduce radii filing as the process of filing curved surfaces or edges, which is commonly required when working with materials like metal or plastic. Discuss the importance of maintaining smooth, even curves when creating joints or refining edges. Explain the tools used for radii filing</p> <p>Practical Work: Guide the students to perform radii filing using appropriate tools.</p> <p>Activity: Organise students into pairs or manageable groups and have them practice filing curved edges or radii on various materials.</p>	<ul style="list-style-type: none"> Interpret drawings Select tools and equipment Take measurements and marking File work piece Check accuracy Observe safety precautions Clean tools, work piece and workplace Store tools, equipment and work piece 	Filed/ground work piece conforms to technical specifications	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to:</p> <ul style="list-style-type: none"> Mark work piece File a work piece <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> Taking measurements Marking work piece Filing and grinding work piece <p>Theories: The student should:</p> <ul style="list-style-type: none"> Identify different types of materials and their properties Explain applications of different materials Describe proper use of files and equipment <p>Circumstantial</p>	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Work bench Set of files File card Try square Steel rule Centre punch Scriber Divider Hacksaw Overall Gloves Safety clear glasses Safety boots 	57

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						knowledge: Detailed knowledge about: <ul style="list-style-type: none"> • Safety precautions pertaining to filling/grinding • Safe handling of working tools and equipment • Waste disposal 		
		(c) Performing angle filing	Brainstorm: Guide students to define angle filing and its importance in shaping and smoothing edges or surfaces at specific angles. Discuss the different angles commonly used in workshop tasks and the tools used Practical Work: Guide the students to perform angle filing using appropriate tools. Hands-On Practice: Organise students into manageable groups or pairs, assigning each group a different angle to file (e.g., 45°, 60°, or	<ul style="list-style-type: none"> • Interpret drawings • Select tools and equipment • Take measurements and marking • File work piece • Check accuracy • Observe safety precautions • Clean tools, work piece and workplace • Store tools, equipment and work piece 	Filed/ground work piece conforms to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: <ul style="list-style-type: none"> • Mark work piece • File a work piece Principles: The student should explain the principles of: <ul style="list-style-type: none"> • Taking measurements • Marking work piece • Filing and grinding work piece Theories: The student should: <ul style="list-style-type: none"> • Identify different types of materials and their properties • Explain applications of different 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Work bench • Set of files • File card • Try square • Steel rule • Centre punch • Scriber • Divider • Hacksaw • Overall • Gloves • Safety clear glasses • Safety boots 	57

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			90°). Have them practice filing the edge of materials, ensuring they maintain the correct angle and smoothness.			materials <ul style="list-style-type: none"> Describe proper use of files and equipment Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions pertaining to filling/grinding Safe handling of working tools and equipment Waste disposal 		
	3.3 Performing Drilling	(a) Performing hand drilling on plate	Brainstorm: Guide the students to define hand drilling and explain its purpose and importance. Discuss the tools involved and the importance of precision and safety during the drilling process Practical Work: Guide the students to perform hand drilling on a plate by using the appropriate drill bit for the material and task. Hands-On Practice:	<ul style="list-style-type: none"> Interpret drawings Select tools, equipment and materials Mark work piece Perform drilling Observe safety precautions Clean tools, equipment and workplace Store tools, equipment 	Drilled hole conforms to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: <ul style="list-style-type: none"> Mark a work piece Drill a work piece Principles: The student should explain the principles of: <ul style="list-style-type: none"> Taking measurements Marking work piece Drill work piece Theories: The student should: <ul style="list-style-type: none"> Identify different 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Work bench Hand drilling machine Centre punch Hammer (Ball pein hammer) Scriber Steel rule Try square Set of drill bits 	48

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			Organise students into manageable groups and have them practice hand drilling on various plates (e.g., metal, wood, plastic). Students should follow the process of marking, clamping, and drilling while maintaining proper technique. Ensure they take turns handling the drill and assist one another with securing the material.	and work piece		types of materials and their properties <ul style="list-style-type: none"> Explain applications of different materials Describe proper use equipment Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions pertaining to filling/grinding Safe handling of working tools and equipment Waste disposal 	<ul style="list-style-type: none"> Bench drilling machine and accessories Oil can Wire brush Vernier calliper Calculator Reamers Safety clear glasses Gloves Goggles Safety boots Overalls 	
		(b) Carrying out drilling on bench drilling machine	Brainstorm: Guide the students to discuss the concept of bench drilling machines and their importance in performing drilling tasks on materials. Discuss the components of the bench drilling machine and explain how they work together to achieve accurate results. Practical Work:	<ul style="list-style-type: none"> Interpret drawings Select tools, equipment and materials Mark work piece Perform drilling Observe safety precautions Clean tools, equipment and 	Drilled hole conforms to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: <ul style="list-style-type: none"> Mark a work piece Drill a work piece Principles: The student should explain the principles of: <ul style="list-style-type: none"> Taking measurements Marking work piece Drill work piece 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Work bench Hand drilling machine Centre punch Hammer (Ball pein hammer) Scriber Steel rule 	48

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			Guide the students to carry out drilling on a bench drilling machine Hands-On Practice: Organise students into manageable groups and have them practice drilling on a bench drilling machine while following all safety protocols. Have them drill holes of varying depths and sizes, ensuring proper technique is followed	workplace • Store tools, equipment and work piece		Theories: The student should: • Identify different types of materials and their properties • Explain applications of different materials • Describe proper use of equipment Circumstantial knowledge: Detailed knowledge about: • Safety precautions pertaining to filling/grinding • Safe handling of working tools and equipment • Waste disposal	<ul style="list-style-type: none"> • Try square • Set of drill bits • Bench drilling machine and accessories • Oil can • Wire brush • Vernier calliper • Calculator • Reamers • Safety clear glasses • Gloves • Goggles • Safety boots • Overalls 	
		(c) Countering bore drilled holes	Brainstorm: Guide the students to discuss the concept of counterbore holes and their purposes. Discuss the tools used for drilling counterbore holes Practical Work: Guide the students to make counterbore holes.	<ul style="list-style-type: none"> • Interpret drawings • Select tools, equipment and materials • Mark work piece • Perform drilling • Observe safety precautions 	Drilled hole conforms to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: • Mark a work piece • Drill a work piece Principles: The student should explain the principles of: • Taking	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Work bench • Hand drilling machine • Centre punch • Hammer (Ball pein 	48

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			Hands-On Practice: Have students work in manageable groups, giving each group tools, equipment and materials for making counterbore holes. Students should follow the procedure, securing the material, setting the machine, and drilling the counterbore holes	<ul style="list-style-type: none"> • Clean tools, equipment and workplace • Store tools, equipment and work piece 		measurements <ul style="list-style-type: none"> • Marking work piece • Drill work piece Theories: The student should: <ul style="list-style-type: none"> • Identify different types of materials and their properties • Explain applications of different materials • Describe proper use equipment Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> • Safety precautions pertaining to filling/grinding • Safe handling of working tools and equipment • Waste disposal 	hammer) <ul style="list-style-type: none"> • Scriber • Steel rule • Try square • Set of drill bits • Bench drilling machine and accessories • Oil can • Wire brush • Vernier calliper • Calculator • Reamers • Safety clear glasses • Gloves • Goggles • Safety boots • Overalls. 	
	3.4 Performing Riveting	(a) Performing manual riveting	Brainstorm: Guide the students to define manual riveting. Discuss the types of rivets commonly used and the tools involved. Explain the importance	<ul style="list-style-type: none"> • Interpret drawings • Select tools, equipment and materials • Mark workpiece 	Riveted pieces conform to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: <ul style="list-style-type: none"> • Mark workpieces 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Rivet sets 	30

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>of accurate riveting in maintaining the strength and integrity of the joint</p> <p>Practical Work: Guide the students to do riveting by using the appropriate rivet size and material for the task.</p> <p>Hands-On Practice: Organise students into pairs, provide them with the materials and equipment needed, and have one student hold the materials while the other performs the riveting.</p>	<ul style="list-style-type: none"> • Perform riveting • Observe safety precautions • Clean tools, equipment, workpiece and workplace • Store tools, equipment and workpiece 		<ul style="list-style-type: none"> • Rivet pieces in different sizes <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Taking measurements • Marking a work piece • Riveting pieces of metals <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Types of joints • Types of rivets • Application of different materials in riveting • Use of cutting tools and equipment <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> • Safety precautions while performing the task • Safe handling of work tools, equipment and work pieces 	<ul style="list-style-type: none"> • Riveting machine and accessories • Steel rule • Wire brush • T-Square • Centre punch • Drilling machine • Set of drill bits • Rivet gun • Piece of wood • Chisel • Divider • Shearing machine • Soft hammer • Ball pein hammer • Air compressor • Rivet head forming tools • Data book • Anvil • Work bench • Pliers • Vice grip • Hacksaw 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						<ul style="list-style-type: none"> Waste disposal 	<ul style="list-style-type: none"> Helmet Goggles Gloves Safety boot Overall 	
		(b) Performing pop riveting	<p>Brainstorm: Guide students to define pop riveting, discuss its applications and components involved in pop riveting.</p> <p>Practical Work: Guide the students to do pop riveting using appropriate rivet size and material for the task.</p> <p>Hands-On Practice: Organise students into manageable groups or pairs, allowing them to practice inserting pop rivets into different materials, such as metal or plastic. Each student should practice using the rivet gun to fasten the materials, focusing on alignment, pressure, and ensuring the rivet</p>	<ul style="list-style-type: none"> Interpret drawings Select tools, equipment and materials Mark work piece Perform riveting Observe safety precautions Clean tools, equipment, work piece and workplace Store tools, equipment and work piece 	Riveted pieces conform to technical specifications	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to:</p> <ul style="list-style-type: none"> Mark work pieces Rivet pieces in different sizes <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> Taking measurements Marking work piece Riveting pieces of metals <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> Types of joints Types of rivets Application of different materials in riveting 	<p>The following tools, equipment and safety gear should be available:</p> <ul style="list-style-type: none"> Rivet sets Riveting machine and accessories Steel rule Wire brush T-Square Centre punch Drilling machine Set of drill bits Rivet gun Piece of wood Chisel Divider Shearing machine Soft hammer 	43

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			expands fully for a secure fit			<ul style="list-style-type: none"> • Use of cutting tools and equipment Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> • Safety precautions while performing the task • Safe handling of work tools, equipment and work pieces • Waste disposal 	<ul style="list-style-type: none"> • Ball peen hammer • Air compressor • Rivet head forming tools • Data book • Anvil • Work bench • Pliers • Vice grip • Hacksaw • Helmet • Goggles • Gloves • Safety boot • Overall 	
		(c) Performing pneumatic riveting	Brainstorm: Guide the students to define pneumatic riveting and discuss the components involved Practical Work: Guide the students to do pneumatic riveting, including selecting the appropriate rivet size for the materials being joined.	<ul style="list-style-type: none"> • Interpret drawings • Select tools, equipment and materials • Mark workpiece • Perform riveting • Observe safety precautions • Clean tools, 	Riveted pieces conform to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: <ul style="list-style-type: none"> • Mark workpieces • Rivet pieces in different sizes Principles: The student should explain the principles of:	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Rivet sets • Riveting machine and accessories • Steel rule • Wire brush • T-Square 	43

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			Hands-On Practice: Organise students into manageable groups or pairs to practice pneumatic riveting on various materials. Each student should take turns operating the pneumatic rivet gun, ensuring proper tool handling, alignment, and rivet expansion.	equipment, workpiece and workplace • Store tools, equipment and workpiece		<ul style="list-style-type: none"> • Taking measurements • Marking work piece • Riveting pieces of metals Theories: The student should explain: <ul style="list-style-type: none"> • Types of joints • Types of rivets • Application of different materials in riveting • Use of cutting tools and equipment Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> • Safety precautions while performing the task • Safe handling of work tools, equipment and work pieces • Waste disposal 	<ul style="list-style-type: none"> • Centre punch • Drilling machine • Set of drill bits • Rivet gun • Piece of wood • Chisel • Divider • Shearing machine • Soft hammer • Ball pein hammer • Air compressor • Rivet head forming tools • Data book • Anvil • Work bench • Pliers • Vice grip • Hacksaw • Helmet • Goggles • Gloves • Safety boot • Overall 	
	3.5 Performing	(a) Carrying out	Brainstorm:	• Interpret	• Cut threads	Knowledge evidence:	The following	64

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
	Threading	dyeing	<p>Guide the students to define dyeing, discuss the types of dyes available, and the materials that can be dyed. Highlight the importance of understanding the dyeing process, including preparation, safety measures, and how to achieve even, vibrant colours</p> <p>Practical Work: Guide the students to perform dyeing by selecting the appropriate material, prepare solution, prepare the fabric, proper immersion, and stirring the solution consistently to ensure even dye coverage.</p> <p>Hands-On Practice: Organise students into manageable groups, providing each group with different types of fabric and dye. Each group should follow the</p>	<p>drawings</p> <ul style="list-style-type: none"> • Select tools, equipment and materials • Mark work piece • Cut threads • Observe safety precautions • Clean tools, equipment, work piece and workplace • Store tools, equipment and work piece 	conform to technical specifications	<p>Detailed knowledge of: Method used: The student should explain how to:</p> <ul style="list-style-type: none"> • Cut external threads • Cut internal threads <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Taking measurements • Select thread pitch • Calculating hole diameter <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • The function of taps and dies • Types of taps and dies • Thread classifications <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> • Safety precautions while cutting threads • Safe handling of tools, equipment and 	<p>tools, equipment and safety gear should be available:</p> <ul style="list-style-type: none"> • Set of dies and stock wrenches • Oil can • Scriber • Steel rule • Micrometers • Thread gauges • Thread data manual • Gloves • Goggles • Safety boots • Overalls 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			dyeing process from preparation through to rinsing and setting the colour. Encourage students to experiment with varying dye concentrations, temperatures, and immersion times to see the effects on colour intensity.			materials <ul style="list-style-type: none"> Waste disposal 		
		(b) Carrying out taping	<p>Brainstorm: Guide the students in defining taping and discuss the different types of tapes and their specific applications.</p> <p>Practical Work: Guide the students to do taping by selecting the appropriate tape for the task, prepare the surface to ensure it is clean and dry before applying tape, measure and cut the tape to the desired length, and pressing the tape down smoothly and evenly along the surface.</p> <p>Hands-On Practice: Organise students into</p>	<ul style="list-style-type: none"> Interpret drawings Select tools, equipment and materials Mark work piece Perform taping Observe safety precautions Clean tools, equipment, work piece and workplace Store tools, equipment and work piece 	Carry out tapping to technical specifications	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to:</p> <ul style="list-style-type: none"> Cut external threads Cut internal threads <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> Taking measurements Select thread pitch Calculating hole diameter <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> The function of taps Types of taps and dies <p>Circumstantial</p>	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Set of taps and stock wrenches Work bench Bench vice Wire brush Oil can Scriber Steel rule Micrometers Thread gauges Vernier calliper Centre punch Thread data 	64

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			pairs or manageable groups, providing each group with different types of tapes and materials to work with. Assign various taping tasks, such as masking edges for painting, securing electrical components, or applying adhesive for temporary bonding. Have students practice applying and removing tape, ensuring they follow the correct technique to achieve a clean, neat result.			knowledge: Detailed knowledge about: <ul style="list-style-type: none"> • Safety precautions while tapping • Safe handling of tools, equipment and materials • Waste disposal 	manual <ul style="list-style-type: none"> • Gloves • Goggles • Safety boots • Overalls 	
	3.6 Performing Metal Forming	(a) Bending flat materials	Brainstorm: Guide the students in defining bending of materials, explain the different types of bending and the tools and equipment involved. Practical Work: Guide the students to apply gradual and consistent force to bend flat materials using the appropriate material for	<ul style="list-style-type: none"> • Interpret drawing • Select tools, equipment and work piece • Mark work piece • Clamp work piece on bench vice • Bend work piece • Observe safety 	Work piece formed conforms to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: <ul style="list-style-type: none"> • Form work pieces in different shapes • Take measurements Principles: The student should explain the principles of: <ul style="list-style-type: none"> • Holding work piece • Forming process • Making allowances 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Work bench • Bench vice • Try square • Vernier calliper • Steel rule • Hacksaw • Level protractor 	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	Services Assessment	Knowledge Assessment		
			<p>the task.</p> <p>Hands-On Practice: Organise students into manageable groups or pairs, provide them with various flat materials (e.g., sheet metal, plastic sheets, wooden planks) and bending tools. Have them practice making both simple and compound bends, starting with gentle bends and gradually progressing to more complex tasks.</p>	<p>precautions</p> <ul style="list-style-type: none"> Clean tools, equipment, work pieces and workplace 		<p>for joints</p> <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> Types of machines and equipment used for metal forming Calculations required Uses of various tools and equipment How to read scales <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> Safety precautions while forming metal Safe handling of tools and equipment Waste disposal 	<ul style="list-style-type: none"> Spring divider Scriber Anvil Centre punch Hammer Radius gauges Bending machine Leather gloves Overall Safety boots Safety glasses 	
		(b) Bending round materials	<p>Brainstorm: Guide the students to explain the concept of bending round materials, and its applications. Discuss the tools and equipment used for bending round materials.</p> <p>Practical Work: Guide the students to bend round materials</p>	<ul style="list-style-type: none"> Interpret drawing Select tools, equipment and workpiece Mark workpiece Clamp work piece on bench vice Bend work piece 	Work piece formed conforms to technical specifications.	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to:</p> <ul style="list-style-type: none"> Form work pieces in different shapes Take measurements <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> Holding work piece 	<p>The following tools, equipment and safety gear should be available:</p> <ul style="list-style-type: none"> Work bench Bench vice Try square Vernier calliper Steel rule Hacksaw 	99

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>using the correct bending technique.</p> <p>Hands-On Practice: Organise students into manageable groups or pairs, providing them with various round materials (e.g., metal rods, copper pipes, steel wires) and the necessary bending tools. Each group should practice bending the materials at different angles and radii, ensuring they apply consistent pressure and follow the correct bending technique.</p>	<ul style="list-style-type: none"> Observe safety precautions Clean tools, equipment, work pieces and workplace 		<ul style="list-style-type: none"> Forming process Making allowances for joints <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> Types of machines and equipment used for metal forming Calculations required Uses of various tools and equipment How to read scales <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> Safety precautions while forming metal Safe handling of tools and equipment Waste disposal 	<ul style="list-style-type: none"> Level protractor Spring divider Scriber Anvil Centre punch Hammer Radius gauges Bending machine Leather gloves Overall Safety boots Safety glasses 	

Form Two

Table 4: Detailed Contents for Form Two

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
1.0 Performing Electrical Joints	1.1 Performing Cold Electrical Joints	(a) Making eyelet joint	<p>Brainstorm: Guide students to define an eyelet joint and discuss its applications</p> <p>Practical Work: Guide the students to make an eyelet joint, showing how to use tools like an eyelet punch, hammer, and the eyelet itself.</p> <p>Activity: Organise students into manageable groups to create eyelet joints in different materials (fabric, leather,</p>	<ul style="list-style-type: none"> Select tools, equipment and materials Prepare cables for joining Make cable joints Test joints Clean tools, equipment and workplace Store tools, equipment and components 	Joint made is mechanically and electrically sound	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to perform an eyelet joint Principles: The student should explain the principle of making cold electrical joints Theories: The student should explain:</p> <ul style="list-style-type: none"> Type of joints and their application Materials used in making joints Soundness of an electrical joint <p>Circumstantial knowledge:</p>	<p>The following tools, safety gear and equipment should be available:</p> <ul style="list-style-type: none"> Digital and analogue multimeters Tool kit Work bench Safety goggles Safety boots Overall/overcoat 	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	Knowledge Assessment		
			metal).			Detailed knowledge about: <ul style="list-style-type: none"> Safety measures involved in making joint Safe handling of tools and equipment 		
		(b) Making crimp joint	Brainstorm: Guide students to define a crimp joint and understand its role in joining wires or attaching connectors in electrical and mechanical systems Practical Work: Guide the students to follow step by step in making a crimp joint Hands-On Practice:	<ul style="list-style-type: none"> Select tools, equipment and materials Prepare cables for joining Make cable joints Test joints Clean tools, equipment and workplace Store tools, equipment and components 	Joint made is mechanically and electrically sound.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: <ul style="list-style-type: none"> Perform crimp joint Principles: The student should explain the principle of making cold electrical joints Theories: The student should explain: <ul style="list-style-type: none"> Type of joints and their application Materials used in making joints 	The following tools, safety gear and equipment should be available: <ul style="list-style-type: none"> Digital and analogue multimeters Tool kit Work bench Safety goggles Safety boots Overall/overcoat 	26

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			Divide students into manageable groups, provide them with various wires, connectors, and crimping tools. Have each group practice making crimp joints for different wire sizes and applications, ensuring proper technique and safety.			<ul style="list-style-type: none"> Soundness of an electrical joint Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety measures involved in making joint Safe handling of tools and equipment 		
		(c) Making parallel groove clamp joint	Brainstorm: Guide students to define a parallel groove clamp joint and explain its purpose in electrical and mechanical applications. Practical Work: Guide the	<ul style="list-style-type: none"> Select tools, equipment and materials Prepare cables for joining Make cable joints Test joints Clean tools, equipment and workplace 	Joint made is mechanically and electrically sound	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: <ul style="list-style-type: none"> Perform clamp joint Principles: The student should explain the principle of making cold	The following tools, safety gear and equipment should be available: <ul style="list-style-type: none"> Digital and analogue multimeters Tool kit Work bench Safety goggles Safety boots Overall/overcoat 	26

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>students to make a parallel groove clamp joint.</p> <p>Hands-On Practice: Organise students into manageable groups and provide them with clamps, conductors, and the necessary tools. Assign tasks such as preparing conductors, aligning them properly in the clamp, and tightening the bolts to the specified torque.</p>	<ul style="list-style-type: none"> Store tools, equipment and components 		<p>electrical joints</p> <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> Type of joints and their application Materials used in making joints Soundness of an electrical joint <p>Circumstantial knowledge:</p> <p>Detailed knowledge about:</p> <ul style="list-style-type: none"> Safety measures involved in making joint Safe handling of tools and equipment 		
		(d) Making bolt joint.	<p>Brainstorm: Guide students to define a bolt joint and its applications in securing two or</p>	<ul style="list-style-type: none"> Select tools, equipment and materials Prepare cables for 	Joint made is mechanically and electrically sound	<p>Knowledge evidence:</p> <p>Detailed knowledge of:</p> <p>Method used: The student should</p>	<p>The following tools, safety gear and equipment should be available:</p> <ul style="list-style-type: none"> Digital and analogue 	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	Knowledge Assessment		
			<p>more components together in mechanical and structural systems.</p> <p>Practical Work: Guide the students to make a bolt joint.</p> <p>Hands-On Practice: Organise students into manageable groups and provide them with materials, bolts, nuts, and washers. Assign each group the task of creating bolt joints for different scenarios, such as securing metal plates,</p>	<p>joining</p> <ul style="list-style-type: none"> • Make cable joints • Test joints • Clean tools, equipment and workplace • Store tools, equipment and components 		<p>explain how to:</p> <ul style="list-style-type: none"> • Perform bolt joint <p>Principles: The student should explain the principle of making cold electrical joints</p> <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Type of joints and their application • Materials used in making joints • Soundness of an electrical joint <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> • Safety measures involved in making joint • Safe handling of tools and equipment 	<p>multimeters</p> <ul style="list-style-type: none"> • Tool kit • Work bench • Safety goggles • Safety boots • Overall/overcoat 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			wooden blocks, or composite materials.					
		(e) Making twist joint	<p>Brainstorm: Guide students to define a twist joint and explain its purpose, particularly in electrical or mechanical applications.</p> <p>Practical Work: Guide the students to make a twist joint.</p> <p>Hands-On Practice: Organise students into manageable groups and provide them with wires, pliers, and insulation materials for</p>	<ul style="list-style-type: none"> • Select tools, equipment and materials • Prepare cables for joining • Make cable joints • Test joints • Clean tools, equipment and workplace • Store tools, equipment and components 	Joint made is mechanically and electrically sound	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to:</p> <ul style="list-style-type: none"> • Perform twist joint <p>Principles: The student should explain the principle of making cold electrical joints</p> <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Type of joints and their application • Materials used in making joints • Soundness of an electrical joint <p>Circumstantial knowledge: Detailed</p>	<p>The following tools, safety gear and equipment should be available:</p> <ul style="list-style-type: none"> • Digital and analogue multimeters • Tool kit • Work bench • Safety goggles • Safety boots • Overall/overcoat 	26

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			electrical twist joints, or rods and tools for mechanical twist joints. Assign tasks such as joining wires to ensure conductivity or securing materials with uniform twists.			knowledge about: <ul style="list-style-type: none"> Safety measures involved in making joint Safe handling of tools and equipment 		
		(f) Making Tee joint	Brainstorm: Guide students to define a tee joint and its applications in various fields such as welding, woodworking, and metalworking. Practical Work: Guide the students to make a tee joint step by step, tailored to the specific	<ul style="list-style-type: none"> Select tools, equipment and materials Prepare cables for joining Make cable joints Test joints Clean tools, equipment and workplace Store tools, equipment and components 	Joint made is mechanically and electrically sound	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: <ul style="list-style-type: none"> Perform tee joint Principles: The student should explain the principle of making cold electrical joints Theories: The student should explain: <ul style="list-style-type: none"> Type of joints and their 	The following tools, safety gear and equipment should be available: <ul style="list-style-type: none"> Digital and analogue multimeters Tool kit Work bench Safety goggles Safety boots Overall/overcoat 	26

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			material and method used. Hands-On Practice: Organise students into manageable groups and provide them with materials and tools appropriate for making tee joints. Assign them a task of preparing the materials, aligning them correctly, and creating tee joints.			application <ul style="list-style-type: none"> Materials used in making joints Soundness of an electrical joint Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety measures involved in making joint Safe handling of tools and equipment 		
		(g) Making married joint	Brainstorm: Guide students to define a married joint and its purpose. Practical Work: Guide the students to make a married	<ul style="list-style-type: none"> Select tools, equipment and materials Prepare cables for joining Make cable joints Test joints Clean tools, 	Joint made is mechanically and electrically sound	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: <ul style="list-style-type: none"> Perform married joint Principles: The	The following tools, safety gear and equipment should be available: <ul style="list-style-type: none"> Digital and analogue multimeters Tool kit Work bench Safety goggles Safety boots 	26

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			joint based on the material and method. Hands-On Practice: Organise students into manageable groups and provide them with materials such as wood, metal, or cables, along with the required tools and adhesives. Assign tasks of preparing materials, aligning them for the joint, and applying the appropriate joining method.	equipment and workplace • Store tools, equipment and components		student should explain the principle of making cold electrical joints Theories: The student should explain: • Type of joints and their application • Materials used in making joints • Soundness of an electrical joint Circumstantial knowledge: Detailed knowledge about: • Safety measures involved in making joint • Safe handling of tools and equipment	• Overall/overcoat	
	1.2 Performing Soldering	(a) Carrying out soft soldering	Brainstorm: Guide students to define soft soldering and its applications,	• Interpret the diagrams • Identify tools, safety gear,	Soldered joint conforms to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The	The following tools, safety gear and equipment should be available: • Tool kit	40

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>such as joining electrical components, plumbing, or delicate metalwork.</p> <p>Practical Work: Guide the students to perform soft soldering.</p> <p>Hands-On Practice: Organise students into manageable groups and provide them with soldering kits, wires, and small metal components. Assign each group the task of creating soft soldered joints for different applications, such as joining</p>	<p>equipment and materials required</p> <ul style="list-style-type: none"> • Prepare parts to be soldered • Solder joints • Remove surplus solder using wire brush • Clean work area • Store tools, safety gear, equipment and materials 		<p>student should explain how to:</p> <ul style="list-style-type: none"> • Solder by using pot and ladle • Solder by using soldering iron • Solder by using soldering gun <p>Principles: The student should explain the principle of:</p> <ul style="list-style-type: none"> • Soft soldering <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Different types of soldering • Type of soldering materials • Application of soldering <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> • Safety precautions during soldering • Safe handling 	<ul style="list-style-type: none"> • Blow lamp • Soldering stand • Analogue and digital multimeters • Overall/overcoat • Safety goggles • Safety boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			wires or attaching components to a circuit board.			of tools and equipment		
		(b) Carrying out hard soldering	<p>Brainstorm: Guide students to define hard soldering, commonly known as brazing, and its applications in joining metals.</p> <p>Practical Work: Guide the students to perform hard soldering step-by-step.</p> <p>Hands-On Practice: Organise students into manageable groups and provide them with metal pieces, brazing rods, torches,</p>	<ul style="list-style-type: none"> • Interpret the diagrams • Identify tools, safety gear, equipment and materials required • Prepare parts to be soldered • Solder joints • Remove surplus solder using wire brush • Clean work area • Store tools, safety gear, equipment and materials 	Soldered joint conforms to technical specifications	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to:</p> <ul style="list-style-type: none"> • Solder by using pot and ladle • Solder by using soldering iron • Solder by using soldering gun <p>Principles: The student should explain the principle of:</p> <ul style="list-style-type: none"> • Hard soldering <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Different types of soldering • Type of soldering materials • Application of soldering 	<p>The following tools, safety gear and equipment should be available:</p> <ul style="list-style-type: none"> • Tool kit • Blow lamp • Soldering stand • Analogue and digital multimeters • Overall/overcoat • Safety goggles • Safety boots 	74

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			and flux. Assign each group the task of creating a hard-soldered joint, such as joining two metal plates or pipes.			Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions during soldering Safe handling of tools and equipment 		
2.0 Building Simple Electric Circuits	2.1 Constructing Resistive Circuits	(a) Building single resistor circuit	Brainstorm: Guide students to define a resistor and its function in electrical circuits. Practical Work: Guide the students to build a simple single resistor circuit. Hands-On Practice: Organise students into manageable groups and	<ul style="list-style-type: none"> Interpret circuit diagram Select tools, equipment and material Select components Construct single resistor circuit Solder constructed circuits Test built circuits Clean tools, equipment and workplace 	Constructed circuits function as per technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: <ul style="list-style-type: none"> Build a simple circuit Principles: The student should explain the principle of: <ul style="list-style-type: none"> Single resistor circuits Theories: The student should explain: <ul style="list-style-type: none"> Different types of circuits Application of 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Work bench Electronics board Tool kit Measuring tape Analogue and digital multimeters Overall Gloves Safety goggles Safety boots 	14

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			provide them with the necessary components. Assign each group the task of constructing a single resistor circuit and measuring its electrical properties.	<ul style="list-style-type: none"> Store tools, equipment and materials 		resistor circuit Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions during circuit building Safe handling of tools and equipment 		
		(b) Building series resistive circuit	Brainstorm: Guide students to define a series resistive circuit and its function in electrical systems. Explain the characteristics of series circuits. Practical Work: Guide the students to build a series resistive circuit. Hands-On Practice:	<ul style="list-style-type: none"> Interpret circuit diagram Select tools, equipment and material Select components Construct series resistive circuit Solder constructed circuits Test the built circuits Clean tools, equipment and 	Constructed circuits function as per technical specifications	Detailed knowledge of: Method used: The student should explain how to: <ul style="list-style-type: none"> Build a simple circuit Build a series circuit Principles: The student should explain the principle of: <ul style="list-style-type: none"> Series resistive circuits Theories: The student should explain: <ul style="list-style-type: none"> Different types of circuits 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Work bench Electronics board Tool kit Measuring tape Analogue and digital multimeters Overall Gloves Safety goggles Safety boots 	14

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			Organise students into manageable groups and provide them tools and assign each group the task of constructing a series circuit with at least two resistors. Have them measure the voltage drop across each resistor, as well as the total resistance and current.	<ul style="list-style-type: none"> workplace Store tools, equipment and materials 		<ul style="list-style-type: none"> Application of series resistive circuit <p>Circumstantial knowledge:</p> <p>Detailed knowledge about:</p> <ul style="list-style-type: none"> Safety precautions during circuit building Safe handling of tools and equipment 		
		(c) Building parallel resistive circuit	<p>Brainstorm: Guide students to define a parallel resistive circuit and explain its characteristics.</p> <p>Practical Work: Guide the students to</p>	<ul style="list-style-type: none"> Interpret circuit diagram Select tools, equipment and material Select components Construct parallel resistive circuit 	Constructed circuits function as per technical specifications.	<p>Detailed knowledge of:</p> <p>Method used: The student should explain how to:</p> <ul style="list-style-type: none"> Build a simple circuit Build parallel circuits <p>Principles: The student should</p>	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Work bench Electronics board Tool kit Measuring tape Analogue and digital multimeters 	14

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			build a parallel resistive circuit. Hands-On Practice: Organise students into manageable groups and provide them tools and assign each group the task of constructing a parallel resistive circuit with at least two resistors. Have them measure the voltage across each resistor, calculate the total resistance, and measure the total current in the circuit.	<ul style="list-style-type: none"> Solder constructed circuits Test the built circuits Clean tools, equipment and workplace Store tools, equipment and materials 		explain the principle of: <ul style="list-style-type: none"> Parallel resistive circuits Theories: The student should explain: <ul style="list-style-type: none"> Different types of circuits Application of parallel resistive circuit Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions during circuit building Safe handling of tools and equipment 	<ul style="list-style-type: none"> Overall Gloves Safety goggles Safety boots 	
		(d) Building combination circuit	Brainstorm: Guide students to define a parallel and series	<ul style="list-style-type: none"> Interpret circuit diagram Select tools, equipment 	Constructed circuits function as per technical specifications	Detailed knowledge of: Method used: The student should explain how to:	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Work bench 	18

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>combination circuit. Explain the basic concept of combining resistors in both series and parallel arrangements within the same circuit. Discuss the applications of combination circuits.</p> <p>Practical Work: Guide the students build and testing a combination circuit.</p> <p>Hands-On Practice: Organise students into manageable groups and assign each group the task of building a</p>	<p>and material</p> <ul style="list-style-type: none"> • Select components • Construct combination circuit • Solder constructed circuits • Test the built circuits • Clean tools, equipment and workplace • Store tools, equipment and materials 		<ul style="list-style-type: none"> • Build a simple circuit • Build a combination circuit <p>Principles: The student should explain the principle of:</p> <ul style="list-style-type: none"> • Combination of series and parallel resistive circuits <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Different types of circuits • Application of combined series and parallel resistive circuit <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> • Safety precautions during circuit building • Safe handling 	<ul style="list-style-type: none"> • Electronics board • Tool kit • Measuring tape • Analogue and digital multimeters • Overall • Gloves • Safety goggles • Safety boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			combination circuit that includes both series and parallel resistors. Have students measure the total current and voltage at various points in the circuit, comparing with results that can be obtained by calculations.			of tools and equipment		
	2.2 Constructing Capacitive Circuits	(a) Building single capacitor circuit	<p>Brainstorm: Guide students to define what a capacitor is and its role in electrical circuits.</p> <p>Practical Work: Guide the students to build a simple single capacitor circuit and measure the</p>	<ul style="list-style-type: none"> • Interpret circuit diagram of capacitive circuit • Select tools, equipment and material required • Prepare capacitors and cables for termination • Construct circuit on 	Constructed capacitive circuit functions as per technical specifications	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to:</p> <ul style="list-style-type: none"> • Connect capacitors in series and parallel • Solder capacitors • Measure capacitance values 	<p>The following tools, equipment and safety gear should be available:</p> <ul style="list-style-type: none"> • Electronics board • Tool kit • Analogue and digital multimeters • Measuring tape • Overall • Safety goggles • Work bench • Safety boots 	14

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>voltage and current across the capacitor during the charging and discharging process.</p> <p>Hands-On Practice: Organise students into manageable groups and provide them with components and have them construct a simple circuit with a capacitor in series with a resistor. Instruct them to compare values measured during the experiment and calculated results obtained.</p>	<p>board</p> <ul style="list-style-type: none"> • Solder built circuits • Test circuit • Record test results • Clean tools, equipment and workplace • Store tools, equipment and materials 		<ul style="list-style-type: none"> • Identify different capacitors • Calculate value of capacitive reactance <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Reading capacitor colour code • Constructing capacitive circuits • Measuring capacitance <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Characteristics of capacitors • Application of different types of capacitors • Electrical symbols <p>Circumstantial knowledge:</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	Services Assessment	Knowledge Assessment		
						Detailed knowledge about: <ul style="list-style-type: none"> • Safety precautions in handling capacitors • Safe handling of work tools and equipment 		
		(b) Building series inductive circuit	Brainstorm: Guide students to define an inductive circuit and explain the concept of inductance Practical Work: Guide the students to build a series inductive circuit. Hands-On Practice: Organise students into	<ul style="list-style-type: none"> • Interpret circuit diagram of capacitive circuit • Select tools, equipment and material required • Prepare capacitors and cables for termination • Construct circuit on board • Solder built circuits • Test circuit • Record test results 	Constructed capacitive circuit functions as per technical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: <ul style="list-style-type: none"> • Connect capacitors in series and parallel • Solder capacitors • Measure capacitance values • Identify different capacitors • Calculate value of capacitive reactance 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Electronics board • Tool kit • Analogue and digital multimeters • Measuring tape • Overall • Safety goggles • Work bench • Safety boots 	14

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			manageable groups and provide them with components such as an inductor, resistor, power source a multimeter, and an oscilloscope Assign each group the task of building a series inductive circuit. Have students measure the total current and voltage drop across the inductor and resistor	<ul style="list-style-type: none"> • Clean tools, equipment and workplace • Store tools, equipment and materials 		<p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Reading capacitor colour code • Constructing capacitive circuits • Measuring capacitance <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Characteristics of capacitors • Application of different types of capacitors • Electrical symbols <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> • Safety precautions in handling capacitors • Safe handling 		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						of work tools and equipment		
		(c) Building parallel capacitive circuits	<p>Brainstorm: Guide students to define a parallel capacitive circuit.</p> <p>Practical Work: Guide the students to construct a parallel capacitive circuit</p> <p>Hands-On Practice: Organise students into manageable groups and provide them with capacitors, a power source, wires, a breadboard, and a multimeter. Assign each group the task</p>	<ul style="list-style-type: none"> Interpret circuit diagram of capacitive circuit Select tools, equipment and material required Prepare capacitors and cables for termination Construct circuit on board Solder built circuits Test circuit Record test results Clean tools, equipment and workplace <p>Store tools, equipment and materials</p>	<ul style="list-style-type: none"> Constructed capacitive circuit functions as per technical specifications 	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to:</p> <ul style="list-style-type: none"> Connect capacitors in series and parallel Solder capacitors Measure capacitance values Identify different capacitors Calculate value of capacitive reactance <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> Reading capacitor colour 	<p>The following tools, equipment and safety gear should be available:</p> <ul style="list-style-type: none"> Electronics board Tool kit Analogue and digital multimeters Measuring tape Overall Safety goggles Work bench Safety boots 	14

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			of building a parallel capacitive circuit with at least two capacitors. Have students measure and record the voltage across each capacitor, confirming that the voltage is the same for all capacitors.			code <ul style="list-style-type: none"> Constructing capacitive circuits Measuring capacitance Theories: The student should explain: <ul style="list-style-type: none"> Characteristics of capacitors Application of different types of capacitors Electrical symbols Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions in handling capacitors Safe handling of work tools and equipment 		
		(d) Building combination circuit	Brainstorm: Guide the students to define	<ul style="list-style-type: none"> Interpret circuit diagram of capacitive 	Constructed capacitive circuit functions as per technical	Knowledge evidence: Detailed knowledge of:	The following tools, equipment and safety gear should be available:	18

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>combination circuit and identify real-life examples of combination circuits.</p> <p>Practical Work: Guide the students to build a basic combination circuit step-by-step. Test the circuit by measuring current and voltage using a multimeter</p> <p>Hands-On Practice: Organise students into manageable groups and provide them with basic materials. Assign each group the task</p>	<p>circuit</p> <ul style="list-style-type: none"> Select tools, equipment and material required Prepare capacitors and cables for termination Construct circuit on board Solder built circuits Test circuit Record test results Clean tools, equipment and workplace Store tools, equipment and materials 	specifications	<p>Method used: The student should explain how to:</p> <ul style="list-style-type: none"> Connect capacitors in series and parallel Solder capacitors Measure capacitance values Identify different capacitors Calculate value of capacitive reactance <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> Reading capacitor colour code Constructing capacitive circuits Measuring capacitance <p>Theories: The</p>	<ul style="list-style-type: none"> Electronics board Tool kit Analogue and digital multimeters Measuring tape Overall Safety goggles Work bench Safety boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			of designing and building a simple combination circuit with specific requirements, such as achieving a desired resistance or voltage drop. After assembling their circuits, students should test them, record measurements, and verify that their circuits meet the given requirements.			student should explain: <ul style="list-style-type: none"> • Characteristics of capacitors • Application of different types of capacitors • Electrical symbols Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> • Safety precautions in handling capacitors • Safe handling of work tools and equipment 		
	2.3 Constructing Inductive Circuits	(a) Building single inductor circuit	Brainstorm: Guide the students to define the concept of an inductor and its role in electrical circuits. Engage	<ul style="list-style-type: none"> • Interpret diagram of inductive circuit • Select tools, equipment and material • Prepare inductors 	Constructed inductive circuit conforms to electrical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: <ul style="list-style-type: none"> • Identify an inductor 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Electronics board • Tool kit • Analogue and digital 	12

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>students in identifying real-life examples of inductors.</p> <p>Practical Work: Guide the students to construct and test a single inductor circuit step-by-step using appropriate components and tools.</p> <p>Hands-On Practice: Organise students into manageable groups and assign them to build and test a single inductor circuit as demonstrated. Have students experiment</p>	<p>and cables for termination</p> <ul style="list-style-type: none"> • Build inductor circuits • Solder built circuits • Test the built circuit • Record test results • Clean tools, equipment and workplace • Store tools and equipment 		<ul style="list-style-type: none"> • Connect inductors in series and parallel • Measure values of inductance • Calculate value of inductive reactance <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Constructing inductive circuits • Measuring inductance <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Characteristics of inductors • Application of different types of inductive circuits • Electrical symbols <p>Circumstantial knowledge:</p>	<p>multimeters</p> <ul style="list-style-type: none"> • Measuring tape • Overall • Safety goggles • Work bench • Safety boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			with different resistor values to observe changes in circuit behaviour			Detailed knowledge about: <ul style="list-style-type: none"> • Safety precautions in inductive loads • Safe handling of tools, equipment and inductors 		
		(b) Building series inductive circuit	Brainstorm: Guide the students to define inductance and its role in electrical circuits. Discuss a series inductive circuit, its connections and practical applications. Practical Work: Guide the students to build and test a series inductive circuit step by step.	<ul style="list-style-type: none"> • Interpret diagram of inductive circuit • Select tools, equipment and material • Prepare inductors and cables for termination • Build inductor circuits • Solder built circuits • Test built circuit • Record test results • Clean tools, 	Constructed inductive circuit conforms to electrical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: <ul style="list-style-type: none"> • Identify an inductor • Connect inductors in series and parallel • Measure values of inductance • Calculate value of inductive reactance Principles: The student should explain the principles of:	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Electronics board • Tool kit • Analogue and digital multimeters • Measuring tape • Overall • Safety goggles • Work bench • Safety boots 	12

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			Hands-On Practice: Organise students into manageable groups and provide them with inductors, resistors, power sources, and basic tools. Assign each group to build a series inductive circuit and measure the total inductance and verify it against their calculations.	equipment and workplace <ul style="list-style-type: none"> Store tools and equipment 		<ul style="list-style-type: none"> Constructing inductive circuits Measuring inductance Theories: The student should explain: <ul style="list-style-type: none"> Characteristics of inductors Application of different types of inductive circuits Electrical symbols Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions in inductive loads Safe handling of tools, equipment and inductors 		
		(c) Building parallel inductive circuit	Brainstorm: Guide the students to define parallel	<ul style="list-style-type: none"> Interpret diagram of inductive circuit 	Constructed inductive circuit conforms to electrical specifications	Knowledge evidence: Detailed knowledge of:	The following tools, equipment and safety gear should be available:	12

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>inductive circuit and explain how it differs from a series inductive circuit. Discuss the practical applications of parallel inductive circuits.</p> <p>Practical Work: Guide the students to build a parallel inductive circuit</p> <p>Hands-On Practice: Organise students into manageable groups and provide them with inductors, resistors, power sources, and multimeters. Assign them</p>	<ul style="list-style-type: none"> Select tools, equipment and material Prepare inductors and cables for termination Build inductor circuits Solder built circuits Test built circuit Record test results Clean tools, equipment and workplace Store tools and equipment 		<p>Method used: The student should explain how to:</p> <ul style="list-style-type: none"> Identify an inductor Connect inductors in series and parallel Measure values of inductance Calculate value of inductive reactance <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> Constructing inductive circuits Measuring inductance <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> Characteristics of inductors Application of different types of inductive 	<ul style="list-style-type: none"> Electronics board Tool kit Analogue and digital multimeters Measuring tape Overall Safety goggles Work bench Safety boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			the task of constructing a parallel inductive circuit with the given specifications for total inductance.			circuits <ul style="list-style-type: none"> Electrical symbols Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions in inductive loads Safe handling of tools, equipment and inductors 		
		(d) Building combination circuit	Brainstorm: Guide the students to define inductor combination circuit, which includes both series and parallel configurations of inductors. Engage students by discussing practical applications Practical	<ul style="list-style-type: none"> Interpret diagram of inductive circuit Select tools, equipment and material Prepare inductors and cables for termination Build inductor circuits Solder built circuits 	Constructed inductive circuit conforms to electrical specifications	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: <ul style="list-style-type: none"> Identify an inductor Connect inductors in series and parallel Measure values of inductance Calculate value of inductive 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Electronics board Tool kit Analogue and digital multimeters Measuring tape Overall Safety goggles Work bench Safety boots 	18

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>Work: Guide the students to build a combination circuit step-by-step from designing, assembling and testing the circuit</p> <p>Hands-On Practice: Divide students into manageable groups and assign them to design, build and test a combination circuit that achieves a specified equivalent inductance</p>	<ul style="list-style-type: none"> • Test built circuit • Record test results • Clean tools, equipment and workplace • Store tools and equipment 		<p>reactance</p> <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Constructing inductive circuits • Measuring inductance <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Characteristics of inductors • Application of different types of inductive circuits • Electrical symbols <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> • Safety precautions in inductive loads <p>Safe handling of tools, equipment and inductors</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	Services Assessment	Knowledge Assessment		
		(e) Testing inductive circuits	<p>Brainstorm: Guide the students to define inductive circuits and their characteristics, focusing on the behaviour of inductors in different configurations (series, parallel, and combination circuits). Discuss why testing inductive circuits is important for ensuring correct function, troubleshooting, and confirming theoretical calculations</p> <p>Practical</p>	<ul style="list-style-type: none"> • Interpret diagram of inductive circuit • Select tools, equipment and material • Prepare inductors and cables for termination • Build inductor circuits • Solder built circuits • Test built circuit • Record test results • Clean tools, equipment and workplace • Store tools and equipment 	Constructed inductive circuit conforms to electrical specifications	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to:</p> <ul style="list-style-type: none"> • Identify an inductor • Connect inductors in series and parallel • Measure values of inductance • Calculate value of inductive reactance <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Constructing inductive circuits • Measuring inductance <p>Theories: The student should</p>	<p>The following tools, equipment and safety gear should be available:</p> <ul style="list-style-type: none"> • Electronics board • Tool kit • Analogue and digital multimeters • Measuring tape • Overall • Safety goggles • Work bench • Safety boots 	9

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>Work: Guide the students to test inductive circuits step by step using a multimeter to observe the time-varying behaviour of the inductive circuitry.</p> <p>Hands-On Practice: Assign students to manageable groups and have each group assemble a specific inductive circuit (series, parallel, or combination) and test its operation.</p>			<p>explain:</p> <ul style="list-style-type: none"> • Characteristics of inductors • Application of different types of inductive circuits • Electrical symbols <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> • Safety precautions in inductive loads • Safe handling of tools, equipment and inductors 		
	2.4 Constructing Resistor Inductor and Capacitor (RLC)	(a) Building resistance and capacitance circuit	Brainstorm: Guide the students to discuss the	<ul style="list-style-type: none"> • Interpret diagram of Resistor Inductor and 	Constructed Resistor Inductor and Capacitor (RLC) circuit functions as	<p>Knowledge evidence: Detailed knowledge of:</p>	The following tools, equipment and safety gear should be available:	17

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
	Circuits		<p>fundamental roles that resistors and capacitors play in electrical systems. Discuss the relationship between resistance, capacitance, and time in RC circuits, and highlight their practical applications.</p> <p>Practical Work: Guide the students to build and test a basic resistance and capacitance (RC) circuit.</p> <p>Hands-On Practice: In manageable groups, have students build their own RC circuits.</p>	<p>Capacitor (RLC) circuit</p> <ul style="list-style-type: none"> Select tools, equipment and materials Prepare inductors, capacitors and resistors Construct circuit on board using inductor, capacitor and resistor Solder built circuit Test circuit Record test results Clean tools, equipment and workplace Store tools, equipment and materials. 	per technical specifications.	<p>Method used: The student should explain how to:</p> <ul style="list-style-type: none"> Construct Resistor Inductor and Capacitor (RLC) circuit Measure value of resistor, capacitor and inductor Calculate impedance of Resistor Inductor and Capacitor (RLC) circuit. <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> Constructing Resistor Inductor and Capacitor (RLC) circuit Measuring value of impedance <p>Theories: The student should</p>	<ul style="list-style-type: none"> Electronics board Tool kit Analogue and digital multimeters Measuring tape Overall Safety goggles Work bench Safety boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			components. Have them assemble the circuit and measure the voltage across the capacitor during charging and discharging phases.			explain: <ul style="list-style-type: none"> Resistor Inductor and Capacitor (RLC) circuit and its behaviour Application of (RLC) circuit Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions when soldering Safe handling of tools and Resistor Inductor and Capacitor (RLC) components. 		
		(b) Building resistance and inductance circuit	Brainstorm: Guide the students to explain the role of resistors in controlling the current flow and the role of inductors in	<ul style="list-style-type: none"> Interpret diagram of Resistor Inductor and Capacitor (RLC) circuit Select tools, equipment 	Constructed Resistor Inductor and Capacitor (RLC)circuit functions as per technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: <ul style="list-style-type: none"> Construct Resistor 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Electronics board Tool kit Analogue and digital 	17

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>opposing changes in current due to their magnetic fields. Discuss the significance of combining resistance and inductance in circuits and how the impedance in an RL circuit is influenced by both components. Encourage students to brainstorm real-life applications of RL circuits</p> <p>Practical Work: Guide the students to build a basic resistance and inductance (RL) circuit and test it</p>	<p>and materials</p> <ul style="list-style-type: none"> • Prepare inductors, capacitors and resistors • Construct circuit on board using inductor, capacitor and resistor • Solder built circuit • Test circuit • Record test results • Clean tools, equipment and workplace • Store tools, equipment and materials. 		<p>Inductor and Capacitor (RLC) circuit</p> <ul style="list-style-type: none"> • Measure value of resistor, capacitor and inductor • Calculate impedance of Resistor Inductor and Capacitor (RLC) circuit. <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Constructing Resistor Inductor and Capacitor (RLC)circuit • Measuring value of impedance <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Resistor Inductor and Capacitor (RLC) circuit 	<p>multimeters</p> <ul style="list-style-type: none"> • Measuring tape • Overall • Safety goggles • Work bench • Safety boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			Hands-On Practice: Assign students to work in manageable groups to build their own RL circuits and measure the voltage across the components and the current in the circuit.			and its behaviour <ul style="list-style-type: none"> Application of (RLC) circuit Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions when soldering Safe handling of tools and Resistor Inductor and Capacitor (RLC) components. 		
		(c) Building resistance, capacitance and inductance circuit	Brainstorm: Guide the students to explain the basic principles of resistance, capacitance, and inductance, and their roles in electrical circuits. Encourage students to brainstorm real-	<ul style="list-style-type: none"> Interpret diagram of Resistor Inductor and Capacitor (RLC) circuit Select tools, equipment and materials Prepare inductors, capacitors 	Constructed Resistor Inductor and Capacitor (RLC) circuit functions as per technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: <ul style="list-style-type: none"> Construct Resistor Inductor and Capacitor (RLC) circuit Measure value of resistor, 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Electronics board Tool kit Analogue and digital multimeters Measuring tape Overall Safety goggles Work bench 	18

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>world application examples of RLC circuits.</p> <p>Practical Work: Guide students through the process of building a resistance, capacitance, and inductance (RLC) circuit</p> <p>Hands-On Practice: Assign students into manageable groups and have them build their own RLC circuits using different values of resistors, capacitors, and inductors Students should take actual measurements and compare</p>	<p>and resistors</p> <ul style="list-style-type: none"> Construct circuit on board using inductor, capacitor and resistor Solder built circuit Test circuit Record test results Clean tools, equipment and workplace Store tools, equipment and materials. 		<p>capacitor and inductor</p> <ul style="list-style-type: none"> Calculate impedance of Resistor Inductor and Capacitor (RLC) circuit. <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> Constructing Resistor Inductor and Capacitor (RLC) circuit Measuring value of impedance <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> Resistor Inductor and Capacitor (RLC) circuit and its behaviour Application of (RLC) circuit <p>Circumstantial</p>	<ul style="list-style-type: none"> Safety boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			with theoretical calculations			knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions when soldering Safe handling of tools and Resistor Inductor and Capacitor (RLC) components. 		
	2.5 Measuring Electric Quantities	(a) Measuring voltage in the circuit	Brainstorm: Guide students to define voltage and its role in an electrical circuit Practical Work: Guide the students to measure voltage using a multimeter. Hands-On Practice: Organise	<ul style="list-style-type: none"> Determine component values Connect simple electric circuits Perform soldering Measure electric quantities Record measured values Clean tools, equipment and workplace 	Recorded values conform to standard values.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: <ul style="list-style-type: none"> Measure components values Measure values of voltage in circuit Principles: The student should explain the principle of: <ul style="list-style-type: none"> Reading colour codes 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Electronics boards Analog and digital Multimeters Tool kit Work bench Work bench light Power supply Safety boots Safety gloves Overall 	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	Knowledge Assessment		
			students into manageable groups and provide them with a simple circuit (e.g., a resistor, power source, and multimeter). Assign each group the task of measuring the voltage across various components in the circuit, such as across a resistor, capacitor, or power supply.	<ul style="list-style-type: none"> Store tools and equipment 		<ul style="list-style-type: none"> Performing soldering Measuring electric quantities <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> Ohm's law Different component ratings Types of electric circuit connections Verification of electric rules and laws Importance of component ratings Types and uses of measuring equipment Application of colour codes <p>Circumstantial knowledge:</p> <p>Detailed knowledge about:</p> <ul style="list-style-type: none"> Safe handling of working 		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						tools <ul style="list-style-type: none"> • Safe handling of measuring instruments. 		
		(b) Measuring current in the circuit	Brainstorm: Guide students to define electric current and its role in an electrical circuit Practical Work: Guide the students to measure current using a multimeter. Hands-On Practice: Organise students into manageable groups and provide them with a simple circuit (e.g., a resistor, power source, and multimeter).	<ul style="list-style-type: none"> • Determine component values • Connect simple electric circuits • Perform soldering • Measure electric quantities • Record measured values • Clean tools, equipment and workplace • Store tools and equipment 	Recorded values conform to standard values.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: <ul style="list-style-type: none"> • Measure components values • Measure values of current in circuit Principles: The student should explain principle of: <ul style="list-style-type: none"> • Reading colour codes • Performing soldering • Measuring electric quantities Theories: The student should explain: <ul style="list-style-type: none"> • Ohm's law 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Electronics boards • Analog and digital multimeters • Tool kit • Work bench • Work bench light • Power supply • Safety boots • Safety gloves • Overall 	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	Knowledge Assessment		
			Have each group measure the current flowing through different components in the circuit, such as the resistor or the entire circuit.			<ul style="list-style-type: none"> • Different component ratings • Types of electric circuit connections • Verification of electric rules and laws • Importance of component ratings • Types and uses of measuring equipment • Application of colour codes <p>Circumstantial knowledge:</p> <p>Detailed knowledge about:</p> <ul style="list-style-type: none"> • Safe handling of working tools • Safe handling of measuring instruments. 		
		(c) Measuring resistance in the circuit	Brainstorm: Guide students to define resistance and its role in an	<ul style="list-style-type: none"> • Determine component values • Connect simple 	Recorded values conform to standard values.	<p>Knowledge evidence:</p> <p>Detailed knowledge of:</p> <p>Method used: The</p>	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Electronics 	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	Knowledge Assessment		
			<p>electrical circuit</p> <p>Practical Work: Guide the students to measure resistance using a digital or analog multimeter.</p> <p>Hands-On Practice: Organise students into manageable groups and provide them with various resistors, a power source (e.g., a battery), and a multimeter. Have each group measure the resistance of individual resistors and compare their</p>	<p>electric circuits</p> <ul style="list-style-type: none"> • Perform soldering • Measure electric quantities • Record measured values • Clean tools, equipment and workplace • Store tools and equipment 		<p>student should explain how to:</p> <ul style="list-style-type: none"> • Measure components values • Measure values of resistance in circuit <p>Principles: The student should explain principle of:</p> <ul style="list-style-type: none"> • Reading colour codes • Performing soldering • Measuring electric quantities <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Ohm's law • Different component ratings • Types of electric circuit connections • Verification of electric rules and laws • Importance of 	<p>boards</p> <ul style="list-style-type: none"> • Analog and digital Multimeters • Tool kit • Work bench • Work bench light • Power supply • Safety boots • Safety gloves • Overall 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			measurements with the labelled values.			component ratings <ul style="list-style-type: none"> Types and uses of measuring equipment Application of colour codes Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safe handling of working tools Safe handling of measuring instruments. 		
3.0 Building Simple Electronic Circuits	3.1 Determine Characteristics of Active Electronic Devices.	(a) Testing characteristics of diode	Brainstorm: Guide students to define a diode and its function in an electrical circuit. Discuss the forward bias and reverse bias conditions of a diode. Introduce key characteristics such as the forward voltage	<ul style="list-style-type: none"> Select tools and equipment Select electronic components Construct circuit for component testing Test electronic component Record test results 	Tested components bear characteristics that conform to specifications as given in component data books.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to test components Principles: The student should explain the principles of: <ul style="list-style-type: none"> Operating test equipment and measuring 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Digital and analogue multimeters Oscilloscope Curve tracer Tool kit Work bench Gloves Overcoat Overall 	32

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>drop and reverse leakage current</p> <p>Practical Work: Guide the students to test the characteristics of a diode using a multimeter</p> <p>Hands-On Practice: Organise students into manageable groups and have students test the diodes in both forward and reverse bias conditions, recording their observations.</p>	<ul style="list-style-type: none"> • Interpret standard test results • Observe safety regulations • Clean tools, equipment and workplace • Store tools, equipment and components 		<p>instruments</p> <ul style="list-style-type: none"> • Testing components <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Types of active electronic components • The difference between passive and active electronic components • Characteristics of active electronic components • Variation of component performance with temperature <p>Circumstantial knowledge: Detailed knowledge about: Safety precautions in electronic work</p> <ul style="list-style-type: none"> • Safe handling of tools, test 	<ul style="list-style-type: none"> • Boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						equipment and measuring instruments <ul style="list-style-type: none"> • Safe handling of electronic components. 		
		(b) Testing characteristics of transistors	<p>Brainstorm: Guide students to define transistors and discuss their characteristics</p> <p>Practical Work: Guide the students how to test transistor characteristics using tools like multimeters or transistor testers</p> <p>Hands-On Practice: Organise students into manageable groups to test various transistors,</p>	<ul style="list-style-type: none"> • Select tools and equipment • Select electronic components • Construct circuit for component testing • Test electronic component • Record test results • Interpret standard test results • Observe safety regulations • Clean tools, equipment and workplace • Store tools, 	Tested components bear characteristics that conform to specifications as given in component data books.	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to test components</p> <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Operating test equipment and measuring instruments • Testing components <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Types of active electronic components 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Digital and analogue multimeters • Oscilloscope • Curve tracer • Tool kit • Work bench • Gloves • Overcoat • Overall • Boots 	32

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			identify their characteristics, and document the results while following safety procedures	equipment and components		<ul style="list-style-type: none"> The difference between passive and active electronic components Characteristics of active electronic components Variation of component performance with temperature Circumstantial knowledge: Detailed knowledge about: Safety precautions in electronic work <ul style="list-style-type: none"> Safe handling of tools, test equipment and measuring instruments Safe handling of electronic components. 		
		(c) Testing characteristics of thyristors	Brainstorm: Guide students to define a	<ul style="list-style-type: none"> Select tools and equipment 	Tested components bear characteristics that conform to	Knowledge evidence: Detailed	The following tools, equipment and safety gear should	32

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>thyristor and explain its role in an electrical circuit. Discuss its application in power control systems</p> <p>Practical Work: Guide the students to test the characteristics of a thyristor using a multimeter and other basic tools. Facilitate testing for Forward Blocking, reverse blocking and triggering the thyristor</p> <p>Hands-On Practice: Divide students into manageable</p>	<ul style="list-style-type: none"> Select electronic components Construct circuit for component testing Test electronic component Record test results Interpret standard test results Observe safety regulations Clean tools, equipment and workplace Store tools, equipment and components 	specifications as given in component data books.	<p>knowledge of: Method used: The student should explain how to test components Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> Operating test equipment and measuring instruments Testing components <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> Types of active electronic components The difference between passive and active electronic components Characteristics of active electronic components Variation of 	<p>be available:</p> <ul style="list-style-type: none"> Digital and analogue multimeters Oscilloscope Curve tracer Tool kit Work bench Gloves Overcoat Overall Boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			groups and provide them with thyristors, a multimeter, and basic circuit components such as resistors and a power supply. Have each group test a thyristor by checking the forward blocking state (no continuity between anode and cathode), then trigger the thyristor by applying a small gate pulse (using a low-voltage DC source or switch) and check if the anode-cathode resistance decreases. Next, students			component performance with temperature Circumstantial knowledge: Detailed knowledge about: Safety precautions in electronic work <ul style="list-style-type: none"> • Safe handling of tools, test equipment and measuring instruments • Safe handling of electronic components 		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			should reverse the polarity to ensure the thyristor blocks reverse current					
		(d) Testing characteristics of opto-electronic devices	<p>Brainstorm: Guide students to define opto-electronic devices and explain their function in electrical circuits</p> <p>Practical Work: Guide the students to test opto-electronic devices using a multimeter and basic circuit components. Focus on common devices like LEDs, photodiodes, and optotransistors</p>	<ul style="list-style-type: none"> • Select tools and equipment • Select electronic components • Construct circuit for component testing • Test electronic component • Record test results • Interpret standard test results • Observe safety regulations • Clean tools, equipment and workplace • Store tools, equipment 	Tested components bear characteristics that conform to specifications as given in component data books.	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to test components Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Operating test equipment and measuring instruments • Testing components <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Types of active electronic components • The difference between passive and 	<p>The following tools, equipment and safety gear should be available:</p> <ul style="list-style-type: none"> • Digital and analogue multimeters • Oscilloscope • Curve tracer • Tool kit • Work bench • Gloves • Overcoat • Overall • Boots 	32

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			Hands-On Practice: Divide students into manageable groups and provide them with various opto-electronic devices (LEDs, photodiodes, optotransistors), a multimeter, and necessary components for testing (e.g., resistors, power supply). Have students test the devices in both forward and reverse directions.	and components		active electronic components <ul style="list-style-type: none"> Characteristics of active electronic components Variation of component performance with temperature Circumstantial knowledge: Detailed knowledge about: Safety precautions in electronic work <ul style="list-style-type: none"> Safe handling of tools, test equipment and measuring instruments Safe handling of electronic components 		
		(e) Testing characteristics of integrated circuits	Brainstorm: Guide students to define integrated circuits (ICs),	<ul style="list-style-type: none"> Select tools and equipment Select electronic 	Tested components bear characteristics that conform to specifications as given in component data	Knowledge evidence: Detailed knowledge of: Method used: The	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Digital and 	33

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>discuss their characteristics</p> <p>Practical Work: Guide the students on safely testing IC characteristics using tools like IC testers or oscilloscopes.</p> <p>Hands-On Practice: Organise students into manageable groups to test different ICs, analyse their characteristics, and document findings while adhering to safety protocols</p>	<p>components</p> <ul style="list-style-type: none"> Construct circuit for component testing Test electronic component Record test results Interpret standard test results Observe safety regulations Clean tools, equipment and workplace Store tools, equipment and components 	books.	<p>student should explain how to test components</p> <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> Operating test equipment and measuring instruments Testing components <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> Types of active electronic components The difference between passive and active electronic components Characteristics of active electronic components Variation of component 	<p>analogue multimeters</p> <ul style="list-style-type: none"> Oscilloscope Curve tracer Tool kit Work bench Gloves Overcoat Overall Boots IC tester 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						performance with temperature Circumstantial knowledge: Detailed knowledge about: Safety precautions in electronic work <ul style="list-style-type: none"> • Safe handling of tools, test equipment and measuring instruments • Safe handling of electronic components. 		
	3.2 Building Rectifier Circuits	(a) Building half-wave rectifier	Brainstorm: Guide students to discuss the concept of rectification and why it is necessary in electrical circuits. Explain the function of a half-wave rectifier. Guide students to brainstorm real-	<ul style="list-style-type: none"> • Interpret circuit diagrams • Select tools, equipment and components • Construct rectifier circuit on board • Perform soldering • Test built rectifier 	Built rectifier circuit produces expected voltage.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to construct a Direct Current (DC). Power supply Principles: The student should explain the principles of: <ul style="list-style-type: none"> • Constructing 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Digital/analog multimeter • Oscilloscope • Tool kit • Soldering iron • Work bench • Work bench light • Magnifying glass • Gloves 	22

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>life applications of half-wave rectifiers</p> <p>Practical Work: Guide the students to build a half-wave rectifier circuit.</p> <p>Hands-On Practice: Assign students into manageable groups and have each group build their own half-wave rectifier circuits using a diode, load resistor, and AC voltage source.</p>	<p>circuits</p> <ul style="list-style-type: none"> Record test results Observe safety precautions Clean tools, equipment and workplace Store tools and equipment 		<p>Direct Current (AC) Power supply</p> <ul style="list-style-type: none"> Performing soldering Rectifying Alternating Current (AC). Voltage <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> Characteristics of DC power supply components Application of rectifier circuits <p>Circumstantial knowledge:</p> <p>Detailed knowledge about:</p> <ul style="list-style-type: none"> Safety precautions in building Direct Current (DC). Power supplies Safe handling of work tools and equipment. 	<ul style="list-style-type: none"> Overcoat/overall Boots 	
		(b) Building full-wave rectifier	Brainstorm: Guide students	<ul style="list-style-type: none"> Interpret circuit 	Built rectifier circuit produces expected	Knowledge evidence:	The following tools, equipment and	22

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
		(center tapped)	<p>to define full-wave rectification, explaining the role of the center-tapped transformer and diodes in rectifying both halves of the AC waveform</p> <p>Practical Work: Guide the students to safely assemble the circuit with a center-tapped transformer, diodes, and a load resistor. Use multimeter and oscilloscopes to measure the output voltage and waveform</p> <p>Hands-On Practice: Organise</p>	<p>diagrams</p> <ul style="list-style-type: none"> Select tools, equipment and components Construct rectifier circuit on board Perform soldering Test built rectifier circuits Record test results Observe safety precautions Clean tools, equipment and workplace Store tools and equipment 	voltage.	<p>Detailed knowledge of: Method used: The student should explain how to construct a Direct Current (DC). Power supply Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> Constructing DC power supply Performing soldering Rectifying AC Voltage <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> Characteristics of dc power supply components Application of rectifier circuits <p>Circumstantial knowledge: Detailed knowledge about:</p>	<p>safety gear should be available:</p> <ul style="list-style-type: none"> Digital/analog multimeter Oscilloscope Tool kit Soldering iron Work bench Work bench light Magnifying glass Gloves Overcoat/overall Boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			students into manageable groups to build the full-wave rectifier circuit, measure the output, and observe the waveform using an oscilloscope. Discuss their findings and compare the performance with a half-wave rectifier.			<ul style="list-style-type: none"> Safety precautions in building Direct Current (DC). Power supplies Safe handling of work tools and equipment 		
		(c) Building bridge rectifier	Brainstorm: Guide students to define bridge rectification, explaining how a bridge rectifier uses four diodes to rectify both halves of an AC waveform Practical Work: Guide the students how to	<ul style="list-style-type: none"> Interpret circuit diagrams Select tools, equipment and components Construct rectifier circuit on board Perform soldering Test built rectifier 	Built rectifier circuit produces expected voltage.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to construct a Direct Current (DC). Power supply Principles: The student should explain the principles of: <ul style="list-style-type: none"> Constructing 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Digital/analog multimeter Oscilloscope Tool kit Soldering iron Work bench Work bench light Magnifying glass Gloves 	22

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			safely assemble the bridge rectifier circuit, using diodes, transformer, and load resistor. Hands-On Practice: Organise students into manageable groups to build the bridge rectifier circuit, measure output voltage, and observe the waveform on an oscilloscope. Discuss findings and compare the bridge rectifier's performance with other types of rectifiers	circuits <ul style="list-style-type: none"> Record test results Observe safety precautions Clean tools, equipment and workplace Store tools and equipment 		Direct Current (AC). Power supply <ul style="list-style-type: none"> Performing soldering Rectifying Alternating Current (AC). Voltage Theories: The student should explain: <ul style="list-style-type: none"> Characteristics of dc power supply components Application of rectifier circuits Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions in building Direct Current (DC). Power supplies Safe handling of work tools and equipment. 	<ul style="list-style-type: none"> Overcoat/overall Boots 	
		(d) Building a smoothing circuit	Brainstorm: Guide students	<ul style="list-style-type: none"> Interpret circuit 	Built smoothing circuit produces	Knowledge evidence:	The following tools, equipment and	22

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>to define smoothing circuits and explain the role of capacitors in reducing ripple and stabilizing the DC output</p> <p>Practical Work: Guide the students to safely assemble a smoothing circuit by connecting a capacitor in parallel with the load resistor and rectifier.</p> <p>Hands-On Practice: Organise students into manageable groups to build the smoothing circuit, calculate the necessary capacitance,</p>	<p>diagrams</p> <ul style="list-style-type: none"> Select tools, equipment and components Construct smoothing circuit on board Perform soldering Test built smoothing circuits Record test results Observe safety precautions Clean tools, equipment and workplace Store tools and equipment 	expected output.	<p>Detailed knowledge of: Method used: The student should explain how to construct a Direct Current (DC). Power supply Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> Constructing Direct Current (AC) Power supply Performing soldering Smoothing the DC Voltage <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> Characteristics of dc power supply components Application of smoothing circuits <p>Circumstantial knowledge:</p>	<p>safety gear should be available:</p> <ul style="list-style-type: none"> Digital/analogue multimeter Oscilloscope Tool kit Soldering iron Work bench Work bench light Magnifying glass Gloves Overcoat/overall Boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			measure the output, and observe the difference with and without smoothing using an oscilloscope			Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions in building Direct Current (DC). Power supplies Safe handling of work tools and equipment. 		
		(e) Testing rectifier circuits	Brainstorm: Guide students to define rectifier circuits and explain their purpose in converting AC to DC. Practical Work: Guide the students to safely test rectifier circuits using multimeters and oscilloscopes to measure DC output, voltage, and waveform.	<ul style="list-style-type: none"> Interpret circuit diagrams Select tools, equipment and components Construct rectifier circuit on board Perform soldering Test built rectifier circuits Record test results Observe safety precautions Clean tools, 	Built rectifier circuit produces expected voltage.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to construct a Direct Current (DC). Power supply Principles: The student should explain the principles of: <ul style="list-style-type: none"> Constructing Direct Current (AC). Power supply Performing soldering Rectifying Alternating 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Digital/analogu e multimeter Oscilloscope Tool kit Soldering iron Work bench Work bench light Magnifying glass Gloves Overcoat/overall Boots 	10

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			Hands-On Practice: Organise students into manageable groups to test different rectifier circuits (half-wave, full-wave, and bridge), measure their outputs, and compare the results	equipment and workplace <ul style="list-style-type: none"> • Store tools and equipment 		Current (AC). Voltage Theories: The student should explain: <ul style="list-style-type: none"> • Characteristics of DC power supply components • Application of rectifier circuits Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> • Safety precautions in building Direct Current (DC). Power supplies • Safe handling of work tools and equipment. 		
	3.3 Servicing Batteries	(a) Charging battery	Brainstorm: Guide students to define battery charging, explain the process, and identify potential	<ul style="list-style-type: none"> • Select tools and equipment • Select power supply for charging battery • Charge battery 	Charged battery produces rated voltage and current.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to charge battery Principles: The	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Direct Current (DC). Power supply unit • Digital and analogue 	15

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>hazards, such as overcharging, battery leaks, and electric shock</p> <p>Practical Work: Guide the students to safely connect a charger to a battery, ensuring proper voltage and current settings.</p> <p>Hands-On Practice: Organise students into manageable groups to charge different types of batteries, monitor the charging process, and identify safe practices to</p>	<ul style="list-style-type: none"> • Measure battery output voltage • Observe safety precautions • Clean tools, equipment and workplace • Store tools and equipment 		<p>student should explain the principles of:</p> <ul style="list-style-type: none"> • Maintaining stable output of direct current (DC) power supply unit • Measuring output voltage of a direct current (DC). Power supply unit • Measuring terminal voltage of a battery <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Parameters of Direct Current (DC). Power supply circuits • Charge and discharge characteristics of battery <p>Circumstantial knowledge: Detailed</p>	<p>multimeters</p> <ul style="list-style-type: none"> • Oscilloscope • Tool kit • Work bench • Battery • Hydrometer • Gloves • Overcoat • Overall • Boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			prevent hazards during charging			knowledge about: <ul style="list-style-type: none"> Safety precautions on handling batteries Safe handling of tools and equipment. 		
		(b) Testing battery	Brainstorm: Guide students to define battery testing, explain the importance of checking voltage, capacity, and health, and identify potential hazards Practical Work: Guide the students to use multimeters and load testers to check battery voltage and performance.	<ul style="list-style-type: none"> Select tools and equipment Select power supply for charging battery Charge battery Measure battery output voltage Observe safety precautions Clean tools, equipment and workplace Store tools and equipment 	Charged battery produces rated voltage and current.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to charge battery Principles: The student should explain the principles of: <ul style="list-style-type: none"> Maintaining stable output of a Direct Current (DC). Power supply unit Measuring output voltage of a Direct Current (DC). Power supply unit 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Direct Current (DC). Power supply unit Digital and analogue multimeters Oscilloscope Tool kit Work bench Battery Hydrometer Gloves Overcoat Overall Boots 	27

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			Hands-On Practice: Organise students into manageable groups to test various batteries, measure their voltage and capacity, and compare the results. Discuss safe handling techniques and the interpretation of test outcomes			<ul style="list-style-type: none"> Measuring terminal voltage of a battery Theories: The student should explain: <ul style="list-style-type: none"> Parameters of Direct Current (DC). Power supply circuits Charge and discharge characteristics of battery Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions on handling batteries Safe handling of tools and equipment. 		
	3.4 Constructing Low/High Frequency Circuits	(a) Building low frequency circuit	Brainstorm: Guide students to define low-frequency circuits, explain their	<ul style="list-style-type: none"> Select tools and equipment Select active electronic components 	Measured circuit parameters conform to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Digital and analogue 	24

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>applications, and identify components like resistors, capacitors, and inductors.</p> <p>Practical Work: Guide the students to safely assemble a low-frequency circuit, ensuring proper component placement and connections.</p> <p>Hands-On Practice: Organise students into manageable groups to build a simple low-frequency circuit, measure the output, and analyse the performance.</p>	<ul style="list-style-type: none"> Construct low frequency circuit Use test equipment Measure the circuit parameter Record measured results Observe safety precautions Clean tools, equipment and workplace Store tools and equipment 		<p>explain how to construct and test low frequency circuit</p> <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> Operating test equipment and measuring instruments Testing electronic circuits <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> The difference between low and high frequency circuits Characteristics of low frequency circuits <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> Safety 	<p>multimeters</p> <ul style="list-style-type: none"> Oscilloscope Frequency meter Curve tracer Power supply unit Tool kit Work bench Gloves Overcoat or overall Boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						precautions in electronic work <ul style="list-style-type: none"> • Safe handling of test equipment and measuring instruments. 		
		(b) Building high frequency circuit	Brainstorm: Guide students to define high-frequency circuits, explain their applications, and identify key components such as transistors, capacitors, and inductors. Practical Work: Guide the students to safely assemble high-frequency circuits, ensuring correct component placement and	<ul style="list-style-type: none"> • Select tools and equipment • Select active electronic components • Construct high frequency circuit • Use test equipment • Measure the circuit parameter • Record measured results • Observe safety precautions • Clean tools, equipment and workplace 	Measured circuit parameters conform to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to construct and test a high frequency circuit Principles: The student should explain the principles of: <ul style="list-style-type: none"> • Operating test equipment and measuring instruments • Testing electronic circuits Theories: The student should explain: <ul style="list-style-type: none"> • The difference 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Digital and analogue multimeters • Oscilloscope • Frequency meter • Curve tracer • Power supply unit • Tool kit • Work bench • Gloves • Overcoat or overall • Boots 	24

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			avoiding damage to sensitive components. Teach the safe use of testing tools like oscilloscopes Hands-On Practice: Organise students into manageable groups to build a high-frequency circuit, measure the output signal, and analyse the results.	<ul style="list-style-type: none"> Store tools and equipment 		between low and high frequency circuits <ul style="list-style-type: none"> Characteristics of high frequency circuits Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions in electronic work Safe handling of test equipment and measuring instruments. 		
		(c) Testing low/high frequency circuits	Brainstorm: Guide students to define low and high-frequency circuits, explaining their applications and key components.	<ul style="list-style-type: none"> Select tools and equipment Select active electronic components Construct low or high frequency circuit Use test 	Measured circuit parameters conform to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to construct and test low or high frequency circuit Principles: The	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Digital and analogue multimeters Oscilloscope Frequency meter Curve tracer 	15

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>Practical Work: Guide the students to safely test low and high-frequency circuits using appropriate tools like oscilloscopes, frequency counters, and multimeters.</p> <p>Hands-On Practice: Organise students into manageable groups to test low and high-frequency circuits, measure their outputs, and analyse the results.</p>	<p>equipment</p> <ul style="list-style-type: none"> • Measure the circuit parameter • Record measured results • Observe safety precautions • Clean tools, equipment and workplace • Store tools and equipment 		<p>student should explain the principles of:</p> <ul style="list-style-type: none"> • Operating test equipment and measuring instruments • Testing electronic circuits <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • The difference between low and high frequency circuits • Characteristics of low frequency circuits • Characteristics of high frequency circuits <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> • Safety precautions in 	<ul style="list-style-type: none"> • Power supply unit • Tool kit • Work bench • Gloves • Overcoat or overall • Boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						electronic work <ul style="list-style-type: none"> Safe handling of test equipment and measuring instruments. 		
	3.5 Troubleshooting Analogue Electronic Circuits	(a) Troubleshooting stabilized power supply	Brainstorm: Guide students to define a stabilized power supply, explaining its components and function. Discuss common faults and potential hazards, such as electrical shock and component damage Practical Work: Guide the students to safely troubleshoot a stabilized power supply, using tools like	<ul style="list-style-type: none"> Select tools and equipment Troubleshoot analogue electronic circuit Identify defective components Replace defective components Observe safety precautions Test circuit Clean tools, equipment and workplace Store tools, equipment and components. 	Analogue electronic circuit serviced as per technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to troubleshoot analogue circuits Principles: The student should explain the principles of: <ul style="list-style-type: none"> Constructing analogue electronic circuits Troubleshooting analogue electronic circuits Operating test equipment and measuring instruments Theories: The	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Digital and analogue multimeters Oscilloscope Direct Current (DC) Power supply unit Signal generator Tool kit Work bench Gloves Overcoat or overall Safety boots 	35

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			multimeters and oscilloscopes. Hands-On Practice: Organise students into manageable groups to troubleshoot a faulty stabilized power supply, identify issues, and test components. Discuss the troubleshooting steps and safe practices throughout the process			<p>student should explain:</p> <ul style="list-style-type: none"> • Performance of electronic components • Parameters of analogue electronic circuits • Types of electrical circuits • Single and multi-stage transistor amplifier <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> • Safety precautions in electronic work • Safe handling of tools, test equipment and measuring instruments • Safe handling of electronic components. 		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
		(b) Troubleshooting single stage transistor amplifier	<p>Brainstorm: Guide students to define a single-stage transistor amplifier, explain its components and common issues</p> <p>Practical Work: Guide the students to safely troubleshoot a single-stage transistor amplifier, using tools like multimeters and oscilloscopes.</p> <p>Hands-On Practice: Organise students into manageable groups to troubleshoot a faulty single-</p>	<ul style="list-style-type: none"> • Select tools and equipment • Troubleshoot analogue electronic circuit • Identify defective components • Replace defective components • Observe safety precautions • Test circuit • Clean tools, equipment and workplace <p>Store tools, equipment and components.</p>	Analogue electronic circuit serviced as per technical specifications.	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to troubleshoot analogue circuits Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Constructing analogue electronic circuits • Troubleshooting analogue electronic circuits • Operating test equipment and measuring instruments <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Performance of electronic components • Parameters of 	<p>The following tools, equipment and safety gear should be available:</p> <ul style="list-style-type: none"> • Digital and analogue multimeters • Oscilloscope • Direct Current (DC). Power supply unit • Signal generator • Tool kit • Work bench • Gloves • Overcoat or overall • Safety boots 	35

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			stage transistor amplifier, identify issues, and test components. Discuss troubleshooting steps and ensure safe practices			analogue electronic circuits <ul style="list-style-type: none"> • Types of electrical circuits • Single and multi-stage transistor amplifier Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> • Safety precautions in electronic work • Safe handling of tools, test equipment and measuring instruments • Safe handling of electronic components. 		
		(c) Troubleshooting multi-stage transistor and amplifier	Brainstorm: Guide students to define a multi-stage transistor amplifier, explaining its	<ul style="list-style-type: none"> • Select tools and equipment • Troubleshoot analogue electronic circuit 	Analogue electronic circuit serviced as per technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Digital and analogue multimeters 	36

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>components and functions. Discuss multi-stage transistor amplifier common issues</p> <p>Practical Work: Guide the students to safely troubleshoot a multi-stage transistor amplifier, using tools like multimeters and oscilloscopes.</p> <p>Hands-On Practice: Organise students into manageable groups to troubleshoot a faulty multi-stage transistor amplifier, identify faults, and test</p>	<ul style="list-style-type: none"> Identify defective components Replace defective components Observe safety precautions Test circuit Clean tools, equipment and workplace <p>Store tools, equipment and components.</p>		<p>troubleshoot analogue circuits</p> <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> Constructing analogue electronic circuits Troubleshooting analogue electronic circuits Operating test equipment and measuring instruments <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> Performance of electronic components Parameters of analogue electronic circuits Types of electrical circuits Single and 	<ul style="list-style-type: none"> Oscilloscope Direct Current (DC). Power supply unit Signal generator Tool kit Work bench Gloves Overcoat or overall Safety boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			individual stages. Discuss the troubleshooting process and ensure safe practices throughout			multi-stage transistor amplifier Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> • Safety precautions in electronic work • Safe handling of tools, test equipment and measuring instruments • Safe handling of electronic components. 		

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	Knowledge Assessment		
1.0 Operating Test Equipment	1.1 Using Signal Generator	(a) Analysing low frequency signal	Brainstorm: Guide students to define low-frequency signals and their applications in electronic systems. Discuss the characteristics of low-frequency signals, such as their amplitude, frequency range, and waveform. Practical Work: Guide the students to analyse low-frequency signals using tools like oscilloscopes, signal generators, and frequency analysers. Hands-On Practice: Organise students into manageable groups and assign	<ul style="list-style-type: none"> Select equipment Identify different frequencies Select range Identify waveforms Observe safety regulations Clean equipment and workplace Store equipment. 	Signal generator produces frequencies that comply with selected ranges.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to generate frequencies and waveforms Principles: The student should explain the principles of: <ul style="list-style-type: none"> Selecting range of frequencies Identifying waveforms Measurement of frequencies Theories: The student should explain: <ul style="list-style-type: none"> Characteristics of waves Application of generated frequencies Circumstantial	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Signal generator Oscilloscope Work bench Work bench light Gloves Overcoat or overall Boots 	30

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			them tasks to analyse low-frequency signals in different scenarios, such as in audio equipment or power supplies. Have them measure and analyse signal characteristics while adhering to safety protocols.			knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions in using signal generators Safe handling of test equipment 		
		(b) Analysing high frequency signal	Brainstorm: Guide students to define high-frequency signals and their applications in electronic systems. Discuss the characteristics of high-frequency signals, such as their amplitude, frequency range, and waveform. Practical Work: Guide the students to analyse high-frequency signals	<ul style="list-style-type: none"> Select equipment Identify different frequencies Select range Identify waveforms Observe safety regulations Clean equipment and workplace Store equipment.	Signal generator produces frequencies that comply with selected ranges.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to generate frequencies and waveforms Principles: The student should explain the principles of: <ul style="list-style-type: none"> Selecting range of frequencies Identifying waveforms Measurement of 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Signal generator Oscilloscope Work bench Work bench light Gloves Overcoat or overall Boots 	30

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>using tools like oscilloscopes, signal generators, and frequency analysers.</p> <p>Hands-On Practice: Organise students into manageable groups and assign them tasks to analyse high-frequency signals in different scenarios, such as in audio equipment or power supplies. Have them measure and analyse signal characteristics while adhering to safety protocols.</p>			<p>frequencies</p> <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Characteristics of waves • Application of generated frequencies <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> • Safety precautions in using signal generators • Safe handling of test equipment 		
	1.2 Using Frequency Meter	(a) Measuring low frequency	<p>Brainstorm: Guide students to define low-frequency signals and their importance in various electronic</p>	<ul style="list-style-type: none"> • Select tools and equipment • Use signal generator • Interpret displayed 	Frequency meter gives frequency values according to set ranges.	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to use frequency meter</p>	<p>The following tools, equipment and safety gear should be available:</p> <ul style="list-style-type: none"> • Oscilloscope • Frequency generator 	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	Knowledge Assessment		
			<p>systems.</p> <p>Practical Work: Guide the students to safely measure low-frequency signals using tools like oscilloscopes or multimeters.</p> <p>Hands-On Practice: Organise students into manageable groups and assign them to measure low-frequency signals in different scenarios.</p>	<p>frequency</p> <ul style="list-style-type: none"> • Read value of measured frequency • Observe safety regulations • Clean tools, equipment and workplace • Store tools and equipment 		<p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Measuring frequency • Adjusting frequency meter before use • Calibrating frequency meter • Theories: The student should explain: • Characteristics of frequency meter • Use of frequency meter • Circumstantial knowledge: • Detailed knowledge about: • Safety precautions when using frequency meters • Safe handling of tools and equipment. 	<ul style="list-style-type: none"> • Frequency meter • Work bench • Work bench light • Gloves • Overcoat or overall • Boots 	
		(b) Measuring intermediate	Brainstorm: Guide students to	<ul style="list-style-type: none"> • Select tools and 	Frequency meter gives	Knowledge evidence: Detailed knowledge	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	Knowledge Assessment		
		frequency	<p>define intermediate frequency signals and their importance in various electronic systems.</p> <p>Practical Work: Guide the students to safely measure intermediate frequency signals using tools like oscilloscopes or multimeters.</p> <p>Hands-On Practice: Organise students into manageable groups and assign them to measure intermediate frequency signals in different scenarios.</p>	<p>equipment</p> <ul style="list-style-type: none"> • Use signal generator • Interpret displayed frequency • Read value of measured frequency • Observe safety regulations • Clean tools, equipment and workplace • Store tools and equipment 	frequency values according to set ranges.	<p>of: Method used: The student should explain how to use frequency meter Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Measuring frequency • Adjusting frequency meter before use • Calibrating frequency meter • Theories: The student should explain: • Characteristics of frequency meter • Use of frequency meter • Circumstantial knowledge: • Detailed knowledge about: • Safety precautions when using frequency meters 	<p>gear should be available:</p> <ul style="list-style-type: none"> • Oscilloscope • Frequency generator • Frequency meter • Work bench • Work bench light • Gloves • Overcoat or overall • Boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						<ul style="list-style-type: none"> Safe handling of tools and equipment. 		
		(c) Measuring high frequencies	<p>Brainstorm: Guide students to define high frequency signals and their importance in various electronic systems.</p> <p>Practical Work: Guide the students to safely measure high frequency signals using tools like oscilloscopes or multimeters.</p> <p>Hands-On Practice: Organise students into manageable groups and assign them to measure high frequency signals in different scenarios.</p>	<ul style="list-style-type: none"> Select tools and equipment Use signal generator Interpret displayed frequency Read value of measured frequency Observe safety regulations Clean tools, equipment and workplace Store tools and equipment 	Frequency meter gives frequency values according to set ranges.	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to use frequency meter Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> Measuring frequency Adjusting frequency meter before use Calibrating frequency meter Theories: The student should explain: Characteristics of frequency meter Use of frequency meter Circumstantial knowledge: Detailed knowledge 	<p>The following tools, equipment and safety gear should be available:</p> <ul style="list-style-type: none"> Oscilloscope Frequency generator Frequency meter Work bench Work bench light Gloves Overcoat or overall Boots 	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	Knowledge Assessment		
						about: <ul style="list-style-type: none"> • Safety precautions when using frequency meters • Safe handling of tools and equipment. 		
	1.3 Using of Oscilloscope	(a) Displaying low frequency signal	Brainstorm: Guide students to define low-frequency signals and identify the tools, such as oscilloscopes, used for their visualization. Practical Work: Guide the students to connect an oscilloscope to a low-frequency signal source. Show students how to adjust settings like time base, voltage scale, and trigger controls to display the signal effectively.	<ul style="list-style-type: none"> • Select tools and equipment • Use oscilloscope • Calibrate oscilloscope • Observe safety regulations • Clean tools and equipment • Store tools and equipment 	Oscilloscope displays measured quantities as per technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to use oscilloscope Principles: The student should explain the principles of: <ul style="list-style-type: none"> • Setting oscilloscope • Measuring electrical quantities using oscilloscope Theories: The student should explain: <ul style="list-style-type: none"> • Parts of oscilloscope • Application of 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Oscilloscope • Signal generator • Work bench • Work bench light • Gloves • Overcoat or overall • Boots 	21

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			Hands-On Practice: Organise students into manageable groups and provide each group with a signal generator and an oscilloscope. Assign them the task of displaying a low-frequency signal, adjusting settings to achieve a clear and stable waveform.			oscilloscope Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions while using oscilloscopes Safe handling of test equipment 		
		(b) Displaying high frequency signal	Brainstorm: Guide students to define high-frequency signals and identify the tools used for their visualization. Practical Work: Guide the students to connect an oscilloscope to a high-frequency signal source. Facilitate the	<ul style="list-style-type: none"> Select tools and equipment Use oscilloscope Calibrate oscilloscope Observe safety regulations Clean tools and equipment Store tools 	Oscilloscope displays measured quantities as per technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to use oscilloscope Principles: The student should explain the principles of: <ul style="list-style-type: none"> Setting oscilloscope 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Oscilloscope Signal generator Work bench Work bench light Gloves Overcoat or overall Boots 	21

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			adjustment of settings to display the signal effectively. Hands-On Practice: Organise students into manageable groups and provide each group with a signal generator and an oscilloscope. Assign them the task of displaying a high-frequency signal, adjusting settings to achieve a clear and stable waveform.	and equipment		<ul style="list-style-type: none"> Measuring electrical quantities using oscilloscope Theories: The student should explain: <ul style="list-style-type: none"> Parts of oscilloscope Application of oscilloscope Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions while using oscilloscopes Safe handling of test equipment 		
		(c) Measuring voltage, current and frequency	Brainstorm: Guide the students to explain the concepts of voltage, current, and frequency measurement in electrical circuits. Discuss their importance in	<ul style="list-style-type: none"> Select tools and equipment Use oscilloscope Calibrate oscilloscope Observe safety regulations 	Oscilloscope displays measured quantities as per technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to use oscilloscope Principles: The student should	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Oscilloscope Signal generator Work bench Work bench light Gloves Overcoat or 	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	Knowledge Assessment		
			circuit analysis and troubleshooting. Practical Work: Guide the students to use a multimeter and frequency counter in measuring voltage across components, current through a circuit, and frequency of an AC signal. Hands-On Practice: Divide students into manageable groups and provide them with sample circuits, multimeters, and signal generators. Assign them the tasks of measuring voltage, current, and frequency at different points in the circuit.	<ul style="list-style-type: none"> • Clean tools and equipment • Store tools and equipment 		explain the principles of: <ul style="list-style-type: none"> • Setting oscilloscope • Measuring electrical quantities using oscilloscope Theories: The student should explain: <ul style="list-style-type: none"> • Parts of oscilloscope • Application of oscilloscope Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> • Safety precautions while using oscilloscopes • Safe handling of test equipment 	overall <ul style="list-style-type: none"> • Boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
2.0 Servicing Audio Equipment	2.1 Servicing AM and FM Radio Receiver	(a) Troubleshooting stages of radio receiver	<p>Brainstorm: Guide students to define the stages of a radio receiver, discuss their functions</p> <p>Practical Work: Guide the students to troubleshoot radio receiver stages using tools like multimeters and signal generators.</p> <p>Hands-On Practice: Organise students into manageable groups to troubleshoot different stages of a radio receiver, identify faults, and propose solutions while following safety procedures</p>	<ul style="list-style-type: none"> Interpret circuit diagrams and manuals Select tools, equipment and components Trace faults in radio receiver Clear faults Perform measurements Test radio receiver Observe safety Clean tools, equipment and workplace Store tools and equipment 	Serviced radio receiver functions according to manufacturer's Specifications.	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to trace faults in defective radio receiver Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> Reception of radio waves Soldering Testing parts of radio receiver <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> Radio frequency band allocation Types of radio receivers Application of radio receivers <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> Safety 	<p>The following tools, equipment and safety gear should be available:</p> <ul style="list-style-type: none"> Radio receiver Digital or analogue multimeter Oscilloscope Tool kit Soldering iron Work bench Work bench light Signal generator Frequency analyser Gloves Overcoat or overall Boots 	21

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						precautions in troubleshooting radio receivers <ul style="list-style-type: none"> Safe handling of work tools and equipment 		
		(b) Troubleshooting faulty stages	Brainstorm: Guide students to define faulty stages in circuits and discuss their causes. Practical Work: Guide the students to troubleshoot a faulty stage using diagnostic tools such as multimeters or oscilloscopes. Hands-On Practice: Organise students into manageable groups to identify and troubleshoot faults in various circuit stages, ensuring adherence to safety protocols	<ul style="list-style-type: none"> Interpret circuit diagrams and manuals Select tools, equipment and components Trace faults in radio receiver Clear faults Perform measurements Test radio receiver Observe safety Clean tools, equipment and workplace Store tools and equipment 	Serviced radio receiver functions according to manufacturer's Specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to trace faults in defective radio receiver Principles: The student should explain the principles of: <ul style="list-style-type: none"> Reception of radio waves Soldering Testing parts of radio receiver Theories: The student should explain: <ul style="list-style-type: none"> Radio frequency band allocation Types of radio receivers 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Radio receiver Digital or analogue multimeter Oscilloscope Tool kit Soldering iron Work bench Work bench light Signal generator Frequency analyser Gloves Overcoat or overall Boots 	21

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						<ul style="list-style-type: none"> Application of radio receivers Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions in troubleshooting radio receivers Safe handling of work tools and equipment. 		
		(c) Replacing defective components	Brainstorm: Guide students to define defective components, discuss common causes of failure Practical Work: Guide the students to safely remove and replace defective components using appropriate tools like soldering irons and desoldering pumps. Hands-On	<ul style="list-style-type: none"> Interpret circuit diagrams and manuals Select tools, equipment and components Clear faults Perform measurements Test radio receiver Observe safety Clean tools, equipment and 	Serviced radio receiver functions according to manufacturer's Specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to trace faults in defective radio receiver Principles: The student should explain the principles of: <ul style="list-style-type: none"> Reception of radio waves Soldering Testing parts of radio receiver Theories: The	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Radio receiver Digital or analogue multimeter Oscilloscope Tool kit Soldering iron Work bench Work bench light Signal generator Frequency analyser Gloves Overcoat or 	21

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			Practice: Organise students into manageable groups to practice identifying defective components in circuits and replacing them while following proper safety protocols	workplace <ul style="list-style-type: none"> Store tools and equipment 		student should explain: <ul style="list-style-type: none"> Radio frequency band allocation Types of radio receivers Application of radio receivers Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions in troubleshooting radio receivers Safe handling of work tools and equipment. 	overall <ul style="list-style-type: none"> Boots 	
		(d) Testing radio receiver	Brainstorm: Guide students to define the purpose of testing a radio receiver and discuss key performance parameters Practical Work: Guide the students to test a radio receiver using	<ul style="list-style-type: none"> Interpret circuit diagrams and manuals Select tools, equipment and components Trace faults in radio receiver Perform measurement 	Serviced radio receiver functions according to manufacturer's Specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to trace faults in defective radio receiver Principles: The student should explain the principles	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Radio receiver Digital or analogue multimeter Oscilloscope Tool kit Soldering iron Work bench 	15

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>tools like signal generators and oscilloscopes to check functionality and performance.</p> <p>Hands-On Practice: Organise students into manageable groups to test radio receivers, identify any faults, and evaluate performance, ensuring all safety procedures are followed.</p>	<p>s</p> <ul style="list-style-type: none"> • Test radio receiver • Observe safety • Clean tools, equipment and workplace • Store tools and equipment 		<p>of:</p> <ul style="list-style-type: none"> • Reception of radio waves • Soldering • Testing parts of radio receiver <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Radio frequency band allocation • Types of radio receivers • Application of radio receivers <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> • Safety precautions in troubleshooting radio receivers • Safe handling of work tools and equipment. 	<ul style="list-style-type: none"> • Work bench light • Signal generator • Frequency analyser • Gloves • Overcoat or overall • Boots 	
	2.2 Troubleshooting Tape Recorder, Compact Disc and Record	(a) Servicing pre-amplifier	<p>Brainstorm: Guide students to define a pre-amplifier, understand its role in audio systems,</p>	<ul style="list-style-type: none"> • Interpret circuit diagrams and manuals • Select tools, equipment 	Serviced tape recorder, compact disc and record player function	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should</p>	<p>The following tools, equipment and safety gear should be available:</p> <ul style="list-style-type: none"> • Digital or analogue 	44

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
	Player		<p>and discuss potential faults</p> <p>Practical Work: Guide the students service a pre-amplifier, including cleaning, checking connections, and testing components like capacitors and transistors.</p> <p>Hands-On Practice: Organise students into manageable groups to service a pre-amplifier. Provide them with tools and equipment to clean, inspect, and test the components, ensuring adherence to safety protocols</p>	<p>and components</p> <ul style="list-style-type: none"> • Troubleshoot tape recorder, compact disc and record player • Identify faulty stages • Replace defective components • Test serviced tape recorder, compact disc and record player • Observe safety regulations • Clean tools, equipment and workplace • Store tools and equipment 	according to manufacturer's specifications.	<p>explain how to service tape recorder, compact disc and record player</p> <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Servicing tape recorder, compact disc and record player • Performing soldering • Testing tape recorder, compact disc and record player <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Types of tape recorders, compact discs and record players • Use of tape recorders, compact discs and record players <p>Circumstantial</p>	<p>multimeter</p> <ul style="list-style-type: none"> • Oscilloscope • Signal generator • Distortion meter • Tool kit • Soldering iron • Work bench • Work bench light • Magnifying glass • Gloves • Overcoat or overall • Boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions in troubleshooting tape recorder, compact disc and record player Safe handling of tools and equipment. 		
		(b) Servicing mechanical parts	Brainstorm: Guide students to define mechanical parts, understand their functions in various systems, and identify common mechanical issues. Practical Work: Guide the students service mechanical parts, including cleaning, lubricating, tightening, and replacing worn components.	<ul style="list-style-type: none"> Interpret circuit diagrams and manuals Select tools, equipment and components Troubleshoot tape recorder, compact disc and record player Identify faulty stages Replace defective components Test serviced tape recorder, 	Serviced tape recorder, compact disc and record player function according to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to service tape recorder, compact disc and record player Principles: The student should explain the principles of: <ul style="list-style-type: none"> Servicing tape recorder, compact disc and record player Performing 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Digital or analogue multimeter Oscilloscope Signal generator Distortion meter Tool kit Soldering iron Work bench Work bench light Magnifying glass Gloves Overcoat or overall Boots 	35

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			Hands-On Practice: Organise students into manageable groups and assign them tasks to service mechanical parts in equipment, such as gear, bearings, or hinges.	compact disc and record player <ul style="list-style-type: none"> • Observe safety regulations • Clean tools, equipment and workplace • Store tools and equipment 		soldering <ul style="list-style-type: none"> • Testing tape recorder, compact disc and record player Theories: The student should explain: <ul style="list-style-type: none"> • Types of tape recorders, compact discs and record players • Use of tape recorders, compact discs and record players Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> • Safety precautions in troubleshooting tape recorder, compact disc and record player Safe handling of tools and equipment.		
	2.3 Servicing	(a) Servicing output	Brainstorm:	<ul style="list-style-type: none"> • Interpret 	Serviced	Knowledge	The following tools,	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	Knowledge Assessment		
	Public Address (PA) and Music Systems	jacks	<p>Guide students to define output jacks and their role in electronic devices. Discuss common issues like loose connections, oxidation, or physical damage</p> <p>Practical Work: Guide the students to service output jacks, including cleaning contacts, tightening connections, and replacing damaged components.</p> <p>Hands-On Practice: Organise students into manageable groups and provide them with devices featuring output jacks to service. Assign tasks such as cleaning,</p>	<p>circuit diagrams and manuals</p> <ul style="list-style-type: none"> Select tools, equipment and components Diagnose public address and music systems Replace defective components Test P.A and music systems Observe safety regulations Clean tools, equipment and workplace Store tools and equipment 	public address (PA) and music systems give required output power as rated by manufacturer.	<p>evidence: Detailed knowledge of: Method used: The student should explain how to service Public Address (PA) and music systems Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> Operation of Public Address (PA) and music systems Servicing a Public Address (PA) and music systems <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> Types of power amplifiers Distortion in power amplifier circuits <p>Circumstantial knowledge: Detailed knowledge</p>	<p>equipment and safety gear should be available:</p> <ul style="list-style-type: none"> Digital or analogue multimeter Oscilloscope Signal generator Distortion meter Public address and music system Tool kit Soldering iron Work bench Work bench light Magnifying glass Gloves Overcoat or overall Boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			inspecting, and testing the jacks to ensure proper functionality while adhering to safety protocols.			about: <ul style="list-style-type: none"> Safety precautions in serving public address and music systems Safe handling of work tools and equipment 		
		(b) Servicing output circuits	Brainstorm: Guide students to define output circuits and understand their role in delivering signals or power in electronic systems. Discuss common issues, such as signal distortion, overheating, or damaged components Practical Work: Guide the students to service output circuits, including inspecting for faulty components,	<ul style="list-style-type: none"> Interpret circuit diagrams and manuals Select tools, equipment and components Diagnose public address and music systems Replace defective components Test P.A and music systems Observe safety regulations 	Serviced public address (PA) and music systems give required output power as rated by manufacturer.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to service Public Address (PA) and music systems Principles: The student should explain the principles of: <ul style="list-style-type: none"> Operation of Public Address (PA) and music systems Servicing a Public Address (PA) and music systems Theories: The	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Digital or analogue multimeter Oscilloscope Signal generator Distortion meter Public address and music system Tool kit Soldering iron Work bench Work bench light Magnifying glass Gloves Overcoat or overall Boots 	26

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			testing circuit, and replacing defective parts. Hands-On Practice: Divide students into manageable groups and provide them with equipment featuring output circuits. Assign tasks like diagnosing faults, performing tests, and implementing repairs.	<ul style="list-style-type: none"> Clean tools, equipment and workplace Store tools and equipment 		student should explain: <ul style="list-style-type: none"> Types of power amplifiers Distortion in power amplifier circuits Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions in serving public address and music systems Safe handling of work tools and equipment 		
		(c) Servicing pre-amplifier circuits	Brainstorm: Guide students to define a pre-amplifier, understand its role in PA and music systems, and discuss potential faults Practical Work: Guide the students	<ul style="list-style-type: none"> Interpret circuit diagrams and manuals Select tools, equipment and components Diagnose public address and music 	Serviced public address (PA) and music systems give required output power as rated by manufacturer.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to service Public Address (PA) and music systems Principles: The student should	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Digital or analogue multimeter Oscilloscope Signal generator Distortion meter Public address and music system 	27

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			to service process for a pre-amplifier, including cleaning, checking connections, and testing components like capacitors and transistors. Hands-On Practice: Organise students into manageable groups to service a pre-amplifier. Provide them with tools and equipment to clean, inspect, and test the components, ensuring adherence to safety protocols	<ul style="list-style-type: none"> systems Replace defective components Test P.A and music systems Observe safety regulations Clean tools, equipment and workplace Store tools and equipment 		explain the principles of: <ul style="list-style-type: none"> Operation of Public Address (PA) and music systems Servicing a Public Address (PA) and music systems Theories: The student should explain: <ul style="list-style-type: none"> Types of power amplifiers Distortion in power amplifier circuits Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions in serving public address and music systems Safe handling of work tools and equipment. 	<ul style="list-style-type: none"> Tool kit Soldering iron Work bench Work bench light Magnifying glass Gloves Overcoat or overall Boots 	
		(d) Testing input jacks	Brainstorm: Guide students to	<ul style="list-style-type: none"> Interpret circuit 	Serviced public address	Knowledge evidence:	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	Knowledge Assessment		
			<p>define input jacks and understand their role in receiving signals or power in electronic systems. Discuss common issues such as loose connections, corrosion, or physical damage</p> <p>Practical Work: Guide the students to test input jacks using tools like multimeters or signal generators to check for continuity and functionality.</p> <p>Hands-On Practice: Organise students into manageable groups and provide them with devices containing input jacks to test. Have them identify and</p>	<p>diagrams and manuals</p> <ul style="list-style-type: none"> Select tools, equipment and components Diagnose public address and music systems Test P.A and music systems Observe safety regulations Clean tools, equipment and workplace Store tools and equipment 	(PA) and music systems give required output power as rated by manufacturer.	<p>Detailed knowledge of: Method used: The student should explain how to service Public Address (PA) and music systems</p> <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> Operation of Public Address (PA) and music systems Servicing a Public Address (PA) and music systems <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> Types of power amplifiers Distortion in power amplifier circuits <p>Circumstantial knowledge: Detailed knowledge</p>	<p>gear should be available:</p> <ul style="list-style-type: none"> Digital or analogue multimeter Oscilloscope Signal generator Distortion meter Public address and music system Tool kit Soldering iron Work bench Work bench light Magnifying glass Gloves Overcoat or overall Boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			troubleshoot any faults, ensuring proper signal reception.			about: <ul style="list-style-type: none"> Safety precautions in serving public address and music systems Safe handling of work tools and equipment. 		
3.0 Testing Digital Electronic Systems	3.1 Constructing Simple Digital Circuit	(a) Constructing multi-vibrator circuits controlled by transistor switch	Brainstorm: Guide students to explain the concept of a multi-vibrator circuit and its functionality as an oscillator or signal generator. Discuss the role of transistors as switches in controlling the operation of multi-vibrator circuits. Discuss the applications, such as in timing devices and waveform generation Practical Work:	<ul style="list-style-type: none"> Select tools and equipment Select electronic components Construct digital circuit Solder components Observe safety precautions 	Constructed digital circuit functions as per technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to construct a digital circuit Principles: The student should explain the principles of: <ul style="list-style-type: none"> Transistor circuit testing Multivibrator circuit testing Theories: The student should explain: <ul style="list-style-type: none"> The meaning of “time delay” Advantages and 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Digital and analogue multimeters Oscilloscope Curve tracer Tool kit Work bench Gloves Overall Boots 	41

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>Guide the students to construct a multi-vibrator circuit using transistors.</p> <p>Hands-On Practice: Organise students into manageable groups and provide them with necessary components and tools. Assign them the task of building a multi-vibrator circuit under controlled supervision.</p>			<p>disadvantages of digital circuits over analogue circuits</p> <ul style="list-style-type: none"> Applications of digital circuits <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> Safety precautions in electronic work Safe handling of tools, equipment and components 		
		(b) Testing multi-vibrator circuits	<p>Brainstorm: Guide students to define multi-vibrator circuits and their types (astable, monostable, and bistable). Discuss their applications in generating waveforms or timing signals.</p>	<ul style="list-style-type: none"> Select tools and equipment Select electronic components Test constructed circuit Record test results Observe 	Constructed digital circuit functions as per technical specifications.	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to construct a digital circuit Principles: The student should explain the principles</p>	<p>The following tools, equipment and safety gear should be available:</p> <ul style="list-style-type: none"> Digital and analogue multimeters Oscilloscope Curve tracer Tool kit Work bench Gloves 	21

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			Practical Work: Guide the students test multi-vibrator circuits. Hands-On Practice: Organise students into manageable groups and provide them with pre-built multi-vibrator circuits. Assign them the task of testing these circuits using oscilloscopes and multimeters.	safety precautions		of: <ul style="list-style-type: none"> Transistor circuit testing Multivibrator circuit testing Theories: The student should explain: <ul style="list-style-type: none"> The meaning of “time delay” Advantages and disadvantages of digital circuits over analogue circuits Applications of digital circuits Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions in electronic work Safe handling of tools, equipment and components. 	<ul style="list-style-type: none"> Overall Boots 	
	3.2 Measuring Parameters of Digital Circuits	(a) Taking measurements in digital circuits	Brainstorm: Guide students to define digital circuits and discuss their	<ul style="list-style-type: none"> Select tools and equipment Select electronic 	Test results conform to standard parameters of digital circuits.	Knowledge evidence: Detailed knowledge of: Method used: The	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Digital and 	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	Knowledge Assessment		
			<p>characteristics, such as binary logic and voltage levels representing logic states.</p> <p>Practical Work: Guide the students to take measurements in digital circuits using tools like digital multimeters, logic probes, and oscilloscopes.</p> <p>Hands-On Practice: Organise students into manageable groups and provide them with simple digital circuits. Assign them tasks to measure logic levels, verify voltage thresholds for logic 0 and logic 1, and</p>	<p>components</p> <ul style="list-style-type: none"> Construct digital electronic circuits Solder components Measure parameters of digital circuits Record results of measurements Clean tools, equipment and workplace Store tools, equipment and components. 		<p>student should explain how to measure parameters of digital circuits</p> <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> Constructing digital circuits Performing soldering Testing digital circuits <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> Parameters of digital circuits Applications of digital circuits <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> Safety precautions in electronic work Safe handling of tools and equipment 	<p>analogue multimeters</p> <ul style="list-style-type: none"> Oscilloscope Tool kit Work bench Gloves Overall Boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			analyse timing diagrams using an oscilloscope.					
		(b) Troubleshooting digital circuits	<p>Brainstorm: Guide students to define digital circuits and identify common faults.</p> <p>Practical Work: Guide the students to troubleshoot digital circuits. Lead them to systematically test connections, components, and logic states to identify faults using diagnostic tools</p> <p>Hands-On Practice: Divide students into manageable groups and provide them with faulty digital circuits. Assign each group the</p>	<ul style="list-style-type: none"> Select tools and equipment Select electronic components Construct digital electronic circuits Solder components Measure parameters of digital circuits Record results of measurements Clean tools, equipment and workplace <p>Store tools, equipment and components.</p>	Test results conform to standard parameters of digital circuits.	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to measure parameters of digital circuits Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> Constructing digital circuits Performing soldering Testing digital circuits <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> Parameters of digital circuits Applications of digital circuits <p>Circumstantial knowledge: Detailed knowledge</p>	<p>The following tools, equipment and safety gear should be available:</p> <ul style="list-style-type: none"> Digital and analogue multimeters Oscilloscope Tool kit Work bench Gloves Overall Boots 	37

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			task of diagnosing and rectifying specific issues, such as missing signals or incorrect logic levels.			about: <ul style="list-style-type: none"> Safety precautions in electronic work Safe handling of tools and equipment 		
	3.3 Determining Responses of Logic Gates	(a) Testing response of logic gates	Brainstorm: Guide the students to define logic gates and their functions. Discuss the importance of testing their response to ensure proper operation in digital circuits. Practical Work: Guide the students to correctly test the response of logic gates using appropriate tools and equipment. Hands-On Practice: Organise students into manageable	<ul style="list-style-type: none"> Select tools and equipment Select electronic components Build logic gate circuits Test responses of logic gate circuits Record test results Clean tools, equipment and workplace Store tools, equipment and components 	Recorded results conform to standard results.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to determine responses of logic gates Principles: The student should explain the principles of: <ul style="list-style-type: none"> Boolean algebra Electronic switches Operation of electronic devices used as switches Operation of different types of electronic logic 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Digital and analogue multimeters Oscilloscope Signal generator Power supply unit Tool kit Work bench Gloves Overcoat Overall Boots 	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	Knowledge Assessment		
			groups and provide them with a breadboard, logic ICs, power supplies, and testing tools. Assign them the task of constructing simple circuits with logic gates, applying different input combinations, and recording the output to confirm the gates' behaviour matches their truth tables			gates Theories: The student should explain: <ul style="list-style-type: none"> • Application of different types of logic gates • Truth tables of logic gates • Possible faults in logic gates Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> • Safety precautions in electronic work Safe handling of tools, equipment and components.		
		(b) Troubleshooting logic circuits	Brainstorm: Guide students to define logic circuits and explain their role in digital electronics. Discuss common issues in logic circuits.	<ul style="list-style-type: none"> • Select tools and equipment • Select electronic components • Build logic gate circuits • Test responses of logic gate 	Recorded results conform to standard results.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to determine responses of logic gates Principles: The student should	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Digital and analogue multimeters • Oscilloscope • Signal generator • Power supply unit • Tool kit 	31

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>Practical Work: Guide the students to properly troubleshoot logic circuits using appropriate tools.</p> <p>Hands-On Practice: Divide students into small groups and provide them with faulty logic circuits. Assign tasks such as analyzing circuit diagrams, identifying faulty components, and testing inputs and outputs.</p>	<p>circuits</p> <ul style="list-style-type: none"> Record test results Clean tools, equipment and workplace Store tools, equipment and components 		<p>explain the principles of:</p> <ul style="list-style-type: none"> Boolean algebra Electronic switches Operation of electronic devices used as switches Operation of different types of electronic logic gates <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> Application of different types of logic gates Truth tables of logic gates Possible faults in logic gates <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> Safety precautions in electronic work Safe handling of tools, equipment 	<ul style="list-style-type: none"> Work bench Gloves Overcoat Overall Boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						and components.		
4.0 Servicing Video Equipment	4.1 Servicing Television Receivers	(a) Servicing power supply system of a Television	<p>Brainstorm: Guide the students to define the power supply system of a television, explain its components, and discuss common faults</p> <p>Practical Work: Guide the students to check common issues and safely service a television power supply system, including powering down the TV, disassembling the unit, and inspecting the power supply components.</p> <p>Hands-On Practice: Divide the students into manageable</p>	<ul style="list-style-type: none"> • Interpret circuit diagrams • Select tools, equipment and components • Troubleshoot Television receiver • Rectify Television faults • Test Television receiver • Observe safety precautions • Clean tools, equipment and workplace 	Serviced Television receiver functions as per the manufacturer ' s specifications.	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to service Television receivers Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Performing soldering • Servicing Television receivers • Testing Television receivers <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Parts of Television receiver • Functions of Television parts • Symbols used in Television 	<p>The following tools, equipment and safety gear should be available:</p> <ul style="list-style-type: none"> • Television receiver • Digital and analogue multimeters • Oscilloscope • Tool kit • Work bench • Work bench light • Magnifying glass • Signal generator • Power supply unit • Gloves • Overcoat • Overall • Boots 	6

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			groups and provide them with a variety of television models (or power supply systems) for servicing. Have them identify issues related to power failure or irregular voltage, and troubleshooting the system.			circuits Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions while servicing Television receivers Safe handling of tools and equipment 		
		(b) Servicing deflection system	Brainstorm: Guide the students to define the deflection system in a television, explaining its role in directing the electron beam to form images on the screen. Practical Work: Guide the students service the deflection system in a television. Hands-On	<ul style="list-style-type: none"> Interpret circuit diagrams Select tools, equipment and components Troubleshoot Television receiver Rectify Television faults Test Television receiver Observe safety 	Serviced Television receiver functions as per the manufacturer 's specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to service Television receivers Principles: The student should explain the principles of: <ul style="list-style-type: none"> Performing soldering Servicing Television 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Television receiver Digital and analogue multimeters Oscilloscope Tool kit Work bench Work bench light Magnifying glass Signal generator Power supply unit Gloves 	6

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			Practice: Divide the students into manageable groups, assigning each group a television with a faulty or malfunctioning deflection system. Have them check the wiring, inspect components for signs of wear or damage, and perform adjustments or replacements where necessary.	precautions <ul style="list-style-type: none"> Clean tools, equipment and workplace 		receivers <ul style="list-style-type: none"> Testing Television receivers Theories: The student should explain: <ul style="list-style-type: none"> Parts of Television receiver Functions of Television parts Symbols used in Television circuits Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions while servicing Television receivers Safe handling of tools and equipment. 	<ul style="list-style-type: none"> Overcoat Overall Boots 	
		(c) Servicing vertical and horizontal circuits	Brainstorm: Guide students in defining the role of vertical and horizontal circuits	<ul style="list-style-type: none"> Interpret circuit diagrams Select tools, equipment 	Serviced Television receiver functions as per the	Knowledge evidence: Detailed knowledge of: Method used: The	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Television 	6

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>in a television, and discuss common faults</p> <p>Practical Work: Guide the students to service vertical and horizontal circuits, emphasizing the inspection of components and the use of tools to detect faults and signal distortions</p> <p>Hands-On Practice: Have students work in manageable groups to troubleshoot televisions with scanning issues. They should diagnose and service the circuits, replacing faulty components and using oscilloscopes to check waveforms</p>	<p>and components</p> <ul style="list-style-type: none"> • Troubleshoot Television receiver • Rectify Television faults • Test Television receiver • Observe safety precautions • Clean tools, equipment and workplace 	<p>manufacturer's specifications.</p>	<p>student should explain how to service Television receivers</p> <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Performing soldering • Servicing Television receivers • Testing Television receivers <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Parts of Television receiver • Functions of Television parts • Symbols used in Television circuits <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> • Safety 	<p>receiver</p> <ul style="list-style-type: none"> • Digital and analogue multimeters • Oscilloscope • Tool kit • Work bench • Work bench light • Magnifying glass • Signal generator • Power supply unit • Gloves • Overcoat • Overall • Boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			and realign circuits.			precautions while servicing Television receivers <ul style="list-style-type: none"> • Safe handling of tools and equipment 		
		(d) Servicing high tension circuits	Brainstorm: Guide students to define high-tension circuits in a television and their role in the power supply system. Discuss hazards, highlighting safety precautions and common faults Practical Work: Guide the students to service high-tension circuits. Hands-On Practice: Organise students into manageable groups to troubleshoot high-tension circuit	<ul style="list-style-type: none"> • Interpret circuit diagrams • Select tools, equipment and components • Troubleshoot Television receiver • Rectify Television faults • Test Television receiver • Observe safety precautions • Clean tools, equipment and workplace 	Serviced Television receiver functions as per the manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to service Television receivers Principles: The student should explain the principles of: <ul style="list-style-type: none"> • Performing soldering • Servicing Television receivers • Testing Television receivers Theories: The student should explain: <ul style="list-style-type: none"> • Parts of 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Television receiver • Digital and analogue multimeters • Oscilloscope • Tool kit • Work bench • Work bench light • Magnifying glass • Signal generator • Power supply unit • Gloves • Overcoat • Overall • Boots 	7

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			issues in televisions. Assign tasks such as testing voltage, inspecting components, and replacing faulty parts, while ensuring safe handling of high-voltage components.			Television receiver <ul style="list-style-type: none"> • Functions of Television parts • Symbols used in Television circuits Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> • Safety precautions while servicing Television receivers • Safe handling of tools and equipment. 		
		(e) Servicing Television sound system	Brainstorm: Guide students to define the television sound system, its components, and discuss common issues. Practical Work: Guide the students to service the sound system,	<ul style="list-style-type: none"> • Interpret circuit diagrams • Select tools, equipment and components • Troubleshoot Television receiver • Rectify Television faults 	Serviced Television receiver functions as per the manufacturer 's specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to service Television receivers Principles: The student should explain the principles of:	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Television receiver • Digital and analogue multimeters • Oscilloscope • Tool kit • Work bench • Work bench light 	6

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>inspecting components like the amplifier and speakers.</p> <p>Hands-On Practice: Divide students into manageable groups and provide televisions with sound issues. Have them diagnose, test, and repair the system.</p>	<ul style="list-style-type: none"> • Test Television receiver • Observe safety precautions • Clean tools, equipment and workplace 		<ul style="list-style-type: none"> • Performing soldering • Servicing Television receivers • Testing Television receivers <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Parts of Television receiver • Functions of Television parts • Symbols used in Television circuits <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> • Safety precautions while servicing Television receivers • Safe handling of tools and equipment. 	<ul style="list-style-type: none"> • Magnifying glass • Signal generator • Power supply unit • Gloves • Overcoat • Overall • Boots 	
		(f) Servicing	Brainstorm:	<ul style="list-style-type: none"> • Interpret 	Serviced	Knowledge	The following tools,	7

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
		Television video system	<p>Guide students to understand the television video system and its components. Discuss common issues related to TV video system</p> <p>Practical Work: Guide the students to detect and diagnose faults and service video system.</p> <p>Hands-On Practice: Divide students into manageable groups to work on televisions with video issues. Have them diagnose problems, inspecting components, and making repairs.</p>	<p>circuit diagrams</p> <ul style="list-style-type: none"> Select tools, equipment and components Troubleshoot Television receiver Rectify Television faults Test Television receiver Observe safety precautions Clean tools, equipment and workplace 	Television receiver functions as per the manufacturer ' s specifications.	<p>evidence: Detailed knowledge of: Method used: The student should explain how to service Television receivers Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> Performing soldering Servicing Television receivers Testing Television receivers <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> Parts of Television receiver Functions of Television parts Symbols used in Television circuits <p>Circumstantial</p>	<p>equipment and safety gear should be available:</p> <ul style="list-style-type: none"> Television receiver Digital and analogue multimeters Oscilloscope Tool kit Work bench Work bench light Magnifying glass Signal generator Power supply unit Gloves Overcoat Overall Boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions while servicing Television receivers Safe handling of tools and equipment 		
	4.2 Installing Television Receiver Antennas	(a) Tuning video signal channels	Brainstorm: Guide students to define the process of tuning video signal channels, explaining its importance in achieving proper signal reception for clear video display. Practical Work: Guide the students to tune video signal channels using the television's controls or external tuning equipment.	<ul style="list-style-type: none"> Select tools, equipment and components Install Television antennas Observe safety precautions Clean tools, equipment and workplace Store tools and equipment 	Installed Television receiving antenna functions according to the instruction manual.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to install Television receiving antennas Principles: The student should explain the principles of: <ul style="list-style-type: none"> Installing Television antennas Tuning different Television stations Theories: The	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Television receiver Antenna Tool kit Digital and analogue multimeters Frequency analyser Signal path finder Work bench Gloves Overcoat Overall Boots 	14

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			Hands-On Practice: Assign each student a task to tune channels, check for optimal signal quality, and identify sources of interference.			student should explain: <ul style="list-style-type: none"> Types of Television signals Function of Television receiving antenna Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precaution when installing Television receiving antennas Safe handling of tools and equipment. 		
		(b) Panning antenna for a clear video signal reception	Brainstorm: Guide students to define the function of an antenna and its role in video signal reception. Discuss how adjusting the antenna's position can help clear up signal interference	<ul style="list-style-type: none"> Select tools, equipment and components Install Television antennas Pan antennas Observe safety precautions Clean tools, 	Installed Television receiving antenna functions according to the instruction manual.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to install Television receiving antennas Principles: The student should explain the principles	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Television receiver Antenna Tool kit Digital and analogue multimeters Frequency 	14

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>and ensure better video quality.</p> <p>Practical Work: Guide the students to pan or adjust an antenna to optimize video signal reception.</p> <p>Hands-On Practice: Organise students into manageable groups, giving them antennas and televisions with weak or no video signals. Assign them the task of panning the antennas to find optimal positions for clear reception. procedures.</p>	<p>equipment and workplace</p> <ul style="list-style-type: none"> • Store tools and equipment 		<p>of:</p> <ul style="list-style-type: none"> • Installing Television antennas • Tuning different Television stations <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Types of Television signals • Function of Television receiving antenna <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> • Safety precaution when installing Television receiving antennas • Safe handling of tools and equipment. 	<p>analyser</p> <ul style="list-style-type: none"> • Signal path finder • Work bench • Gloves • Overcoat • Overall • Boots 	
		(c) Tuning colour and hue	Brainstorm: Guide students to understand colour and hue in	<ul style="list-style-type: none"> • Select tools, equipment and components 	Installed Television receiving antenna	Knowledge evidence: Detailed knowledge of:	The following tools, equipment and safety gear should be available:	14

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>television systems, emphasizing their importance for accurate image quality.</p> <p>Practical Work: Guide the students to adjust the colour and hue settings on a television.</p> <p>Hands-On Practice: In manageable groups, have students adjust the colour and hue settings on TVs with display issues.</p>	<ul style="list-style-type: none"> • Install Television antennas • Pan antennas • Tune colour and hue • Observe safety precautions • Clean tools, equipment and workplace • Store tools and equipment 	functions according to the instruction manual	<p>Method used: The student should explain how to install Television receiving antennas</p> <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Installing Television antennas • Tuning different Television stations • Tuning colour and hue <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Types of Television signals • Function of Television receiving antenna <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> • Safety precaution 	<ul style="list-style-type: none"> • Television receiver • Antenna • Tool kit • Digital and analogue multimeters • Frequency analyser • Signal path finder • Work bench • Gloves • Overcoat • Overall • Boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						when installing Television receiving antennas <ul style="list-style-type: none"> • Safe handling of tools and equipment. 		
	4.3 Servicing Video Cassette Recorders (VCRs)	(a) Servicing power supply system of Video Cassette recorder (VCRs)	Brainstorm: Guide students to define the power supply system of a Video Cassette Recorder (VCR), explain its role in providing the necessary voltage and current for the VCR's operation and discuss common issues Practical Work: Guide the students to inspect components, diagnose faults and service the power supply system of a VCR. Hands-On Practice: Organise students	<ul style="list-style-type: none"> • Select tools and equipment • Dismantle video cassette recorder • Service parts of video cassette recorder • Re-assemble video cassette recorder • Test video cassette recorder • Clean tools, equipment and workplace • Store tools and equipment 	Serviced video cassette recorder functions as per the manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to service parts of video cassette recorder Principles: The student should explain the principles of: <ul style="list-style-type: none"> • Dismantling video cassette recorder • Testing various parts of video cassette recorder • Assembling video cassette recorder Theories: The student should	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Video Cassette Recorder • Digital and analogue multimeters • Oscilloscope • Digital frequency meter • Signal generator • Power supply unit • Tool kit • Work bench • Gloves • Overcoat • Overall • Boots 	8

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			into manageable groups and provide them with VCRs exhibiting power supply issues. Assign tasks like testing components, replacing faulty parts, and ensuring the proper voltage output.			explain: <ul style="list-style-type: none"> • Power supply circuit parameters • Sound pick-up and amplification • Video pick-up and amplification technology • Sound and video recording • Parts of video cassette recorder (VCRs) and their functions • Modulator system Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> • Safety precautions during servicing Video Cassette Recorder (VCR) • Safe handling of tools and equipment. 		
		(b) Servicing mechanical part	Brainstorm: Guide students to understand the	<ul style="list-style-type: none"> • Select tools and equipment 	Serviced video cassette recorder	Knowledge evidence: Detailed knowledge	The following tools, equipment and safety gear should be	8

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>mechanical parts of a VCR. Discuss their functions and common issues</p> <p>Practical Work: Guide the students to service VCR mechanical components, including inspection, cleaning, lubrication, and troubleshooting of moving parts. Show the students how to replace faulty components</p> <p>Hands-On Practice: In manageable groups, students practice disassembling and repairing mechanical parts of VCRs, replacing worn-out parts</p>	<ul style="list-style-type: none"> • Dismantle video cassette recorder • Service parts of video cassette recorder • Re-assemble video cassette recorder • Test video cassette recorder • Clean tools, equipment and workplace • Store tools and equipment 	functions as per the manufacturer's specifications.	<p>of: Method used: The student should explain how to service parts of video cassette recorder Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Dismantling video cassette recorder • Testing various parts of video cassette recorder • Assembling video cassette recorder <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Power supply circuit parameters • Sound pick-up and amplification • Video pick-up and amplification technology • Sound and video recording 	<p>available:</p> <ul style="list-style-type: none"> • Video Cassette Recorder • Digital and analogue multimeters • Oscilloscope • Digital frequency meter • Signal generator • Power supply unit • Tool kit • Work bench • Gloves • Overcoat • Overall • Boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						<ul style="list-style-type: none"> Parts of video cassette recorder (VCRs) and their functions Modulator system Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions during servicing Video Cassette Recorder (VCR) Safe handling of tools and equipment. 		
		(c) Servicing all switches	Brainstorm: Guide students to understand the different switches in a VCR, their functions, and common faults. Practical Work: Guide the students to service VCR switches by showing how to clean, test, and	<ul style="list-style-type: none"> Select tools and equipment Dismantle video cassette recorder Service parts of video cassette recorder Re-assemble video cassette recorder Test video 	Serviced video cassette recorder functions as per the manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to service parts of video cassette recorder Principles: The student should explain the principles of: <ul style="list-style-type: none"> Dismantling 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Video Cassette Recorder Digital and analogue multimeters Oscilloscope Digital frequency meter Signal generator Power supply unit 	8

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			replace faulty switches. Hands-On Practice: Assign students to groups and provide faulty VCRs with switch issues. Have them diagnose the problem, clean or replace the switches, and test the device afterward	cassette recorder <ul style="list-style-type: none"> • Clean tools, equipment and workplace • Store tools and equipment 		video cassette recorder <ul style="list-style-type: none"> • Testing various parts of video cassette recorder • Assembling video cassette recorder Theories: The student should explain: <ul style="list-style-type: none"> • Power supply circuit parameters • Sound pick-up and amplification • Video pick-up and amplification technology • Sound and video recording • Parts of video cassette recorder (VCRs) and their functions • Modulator system Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> • Safety 	<ul style="list-style-type: none"> • Tool kit • Work bench • Gloves • Overcoat • Overall • Boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						precautions during servicing Video Cassette Recorder (VCR) <ul style="list-style-type: none"> • Safe handling of tools and equipment. 		
		(d) Servicing modulator system	Brainstorm: Introduce students to the modulator system in a VCR, explaining its function in converting video signals for broadcast. Discuss common issues such as weak or distorted signals and highlight safety concerns related to electrical components Practical Work: Guide the students to inspect and test the modulator system using tools like oscilloscopes and multimeters	<ul style="list-style-type: none"> • Select tools and equipment • Dismantle video cassette recorder • Service parts of video cassette recorder • Re-assemble video cassette recorder • Test video cassette recorder • Clean tools, equipment and workplace • Store tools and equipment 	Serviced video cassette recorder functions as per the manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to service parts of video cassette recorder Principles: The student should explain the principles of: <ul style="list-style-type: none"> • Dismantling video cassette recorder • Testing various parts of video cassette recorder • Assembling video cassette recorder Theories: The student should explain:	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Video Cassette Recorder • Digital and analogue multimeters • Oscilloscope • Digital frequency meter • Signal generator • Power supply unit • Tool kit • Work bench • Gloves • Overcoat • Overall • Boots 	9

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>to identify signal issues or faulty components</p> <p>Hands-On Practice: Divide students into manageable groups and assign them VCRs with modulator problems to diagnose and repair</p>			<ul style="list-style-type: none"> Power supply circuit parameters Sound pick-up and amplification Video pick-up and amplification technology Sound and video recording Parts of video cassette recorder (VCRs) and their functions Modulator system <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> Safety precautions during servicing Video Cassette Recorder (VCR) Safe handling of tools and equipment. 		
	4.4 Servicing Video Cameras	(a) Servicing power supply	<p>Brainstorm: Guide students to define the power supply system in a</p>	<ul style="list-style-type: none"> Select tools and equipment Interpret 	Serviced video camera functions as per the	<p>Knowledge evidence: Detailed knowledge of:</p>	The following tools, equipment and safety gear should be available:	4

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>video camera and explain its role in providing the necessary voltage for the camera's operation. Discuss common issues such as power failure, inconsistent voltage and overheating.</p> <p>Practical Work: Guide the students to service the power supply in a video camera, focusing on inspecting components like the power adapter, voltage regulators, and battery connections.</p> <p>Hands-On Practice: Divide students into manageable groups and provide them with video cameras</p>	<p>video camera manufacturer's manual</p> <ul style="list-style-type: none"> • Interpret video camera circuit diagrams • Troubleshoot video camera • Repair video camera • Test video camera • Observe safety precaution • Clean tools, equipment and workplace • Store tools and equipment 	<p>manufacturer's specifications.</p>	<p>Method used: The student should explain how to service video camera</p> <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Performing electrical soldering • Performing measurements • Servicing video camera • Testing video camera <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Application of video camera • Types of video cameras • Parts of video camera and their functions • Possible faults in camera <p>Circumstantial knowledge:</p>	<ul style="list-style-type: none"> • Video camera • Digital and analogue multimeters • Oscilloscope • Tool kit • Work bench • Work bench light • Magnifying glass • Gloves • Overcoat • Overall • Boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			that are experiencing power supply issues. Have them diagnose problems, check connections, and test the power supply components, such as the adapter or battery, and replace faulty parts.			Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions when servicing video cassette Safe handling of tools and equipment 		
		(b) Servicing system control	Brainstorm: Guide students to define the system control components in a video camera, including the buttons, switches, and microcontroller that manage the camera's operations. Discuss common issues such as unresponsive controls, malfunctioning	<ul style="list-style-type: none"> Select tools and equipment Interpret video camera manufacturer's manual Interpret video camera circuit diagrams Troubleshoot video camera Repair video camera Test video camera Observe 	Serviced video camera functions as per the manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to service video camera Principles: The student should explain the principles of: <ul style="list-style-type: none"> Performing electrical soldering Performing measurements Servicing video 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Video camera Digital and analogue multimeters Oscilloscope Tool kit Work bench Work bench light Magnifying glass Gloves Overcoat Overall Boots 	4

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>buttons, or system errors.</p> <p>Practical Work: Guide the students to service the system control, focusing on troubleshooting the control circuit, inspecting buttons, switches, and the microcontroller.</p> <p>Hands-On Practice: Organise students into manageable groups and provide video cameras with control system issues. Have students diagnose problems and repair or replace faulty parts.</p>	<p>safety precaution</p> <ul style="list-style-type: none"> • Clean tools, equipment and workplace • Store tools and equipment 		<p>camera</p> <ul style="list-style-type: none"> • Testing video camera <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Application of video camera • Types of video cameras • Parts of video camera and their functions • Possible faults in camera <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> • Safety precautions when servicing video cassette • Safe handling of tools and equipment. 		
		(c) Servicing the Charged Coupled Device (CCD) drive	Brainstorm: Guide students to define the role of the Charged	<ul style="list-style-type: none"> • Select tools and equipment • Interpret 	Serviced video camera functions as per the	Knowledge evidence: Detailed knowledge of:	The following tools, equipment and safety gear should be available:	4

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>Coupled Device (CCD) and its drive-in video cameras, explaining how it captures light and converts it into electrical signals. Discuss potential issues such as image distortion and failure to capture images</p> <p>Practical Work: Guide the students to inspect and troubleshoot the CCD drive.</p> <p>Hands-On Practice: In manageable groups, students diagnose and service video cameras with CCD drive issues, using diagnostic tools to check components and replace faulty</p>	<p>video camera manufacturer's manual</p> <ul style="list-style-type: none"> • Interpret video camera circuit diagrams • Troubleshoot video camera • Repair video camera • Test video camera • Observe safety precaution • Clean tools, equipment and workplace • Store tools and equipment 	<p>manufacturer's specifications.</p>	<p>Method used: The student should explain how to service video camera</p> <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Performing electrical soldering • Performing measurements • Servicing video camera • Testing video camera <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Application of video camera • Types of video cameras • Parts of video camera and their functions • Possible faults in camera <p>Circumstantial knowledge: Detailed knowledge</p>	<ul style="list-style-type: none"> • Video camera • Digital and analogue multimeters • Oscilloscope • Tool kit • Work bench • Work bench light • Magnifying glass • Gloves • Overcoat • Overall • Boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			parts.			about: <ul style="list-style-type: none"> Safety precautions when servicing video cassette Safe handling of tools and equipment 		
		(d) Servicing the optical system	Brainstorm: Guide students to understand the optical system of a video camera and its parts. Discuss common issues like blurry images and misalignment Practical Work: Guide the students service the optical system, focusing on tasks like cleaning lenses, adjusting the focus mechanism, and ensuring proper alignment of components. Emphasize careful handling to avoid	<ul style="list-style-type: none"> Select tools and equipment Interpret video camera manufacturer's manual Interpret video camera circuit diagrams Troubleshoot video camera Repair video camera Test video camera Observe safety precaution Clean tools, equipment and workplace 	Serviced video camera functions as per the manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to service video camera Principles: The student should explain the principles of: <ul style="list-style-type: none"> Performing electrical soldering Performing measurements Servicing video camera Testing video camera Theories: The student should explain:	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Video camera Digital and analogue multimeters Oscilloscope Tool kit Work bench Work bench light Magnifying glass Gloves Overcoat Overall Boots 	4

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			damage to sensitive parts Hands-On Practice: In manageable groups, students will work on video cameras with optical system problems, performing tasks such as lens cleaning, focus adjustment, and component replacement.	<ul style="list-style-type: none"> Store tools and equipment 		<ul style="list-style-type: none"> Application of video camera Types of video cameras Parts of video camera and their functions Possible faults in camera Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions when servicing video cassette Safe handling of tools and equipment. 		
		(e) Servicing luminance and chrominance circuits	Brainstorm: Guide students to understand the functions of luminance and chrominance circuits in video systems, focusing on their roles in controlling brightness and colour. Discuss	<ul style="list-style-type: none"> Select tools and equipment Interpret video camera manufacturer's manual Interpret video camera circuit diagrams Troubleshoot 	Serviced video camera functions as per the manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to service video camera Principles: The student should explain the principles of:	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Video camera Digital and analogue multimeters Oscilloscope Tool kit Work bench 	4

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>common faults like colour distortion and poor contrast</p> <p>Practical Work: Guide the students service luminance and chrominance circuits by inspecting components and using diagnostic tools like multimeters and oscilloscopes to identify and fix faults</p> <p>Hands-On Practice: Have students work in manageable groups to troubleshoot and repair video systems with luminance and chrominance issues.</p>	<p>video camera</p> <ul style="list-style-type: none"> • Repair video camera • Test video camera • Observe safety precaution • Clean tools, equipment and workplace • Store tools and equipment 		<ul style="list-style-type: none"> • Performing electrical soldering • Performing measurements • Servicing video camera • Testing video camera <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Application of video camera • Types of video cameras • Parts of video camera and their functions • Possible faults in camera <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> • Safety precautions when servicing video cassette • Safe handling of tools and equipment. 	<ul style="list-style-type: none"> • Work bench light • Magnifying glass • Gloves • Overcoat • Overall • Boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
	4.5 Servicing Video Compact Disc (VCD) And Digital Video Disc (DVD)	(a) Servicing mechanical system	<p>Brainstorm: Guide students to understand the mechanical system of VCD and DVD players, focusing on components like motors, gear, and trays. Discuss common issues such as disc reading failures and tray malfunctions</p> <p>Practical Work: Guide the students to service mechanical system of VCD and DVD, including inspecting motors, belts, and trays.</p> <p>Hands-On Practice: Divide students into manageable groups and assign them faulty VCD and DVD players.</p>	<ul style="list-style-type: none"> Identify parts of Digital Video Disc (DVD) and Video Compact Disc (VCD) Select tools, equipment and components Perform soldering Troubleshoot Digital Video Disc (DVD) and Video Compact Disc (VCD) Replace faulty components Test Digital Video Disc and Video Compact Disc circuits Observe safety precautions Clean tools, equipment 	Serviced Digital Video Disc (DVD) and Video Compact Disc (VCD) function according to manufacturer's specifications.	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain procedures of servicing Digital Video Disc and Video Compact Disc</p> <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> Diagnosing Video Compact Disc and Digital Video Disc Performing soldering Testing serviced Digital Video Disc and Video Compact Disc <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> The difference between Digital Video Disc and Video Compact 	<p>The following tools, equipment and safety gear should be available:</p> <ul style="list-style-type: none"> Video Compact Disc or Digital Video Disc Digital or analogue multimeters Oscilloscope Tool kit Work bench Work bench light Magnifying light Soldering iron Gloves Overcoat/Overall Boots 	14

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			Have them diagnose and repair mechanical issues, ensuring safe handling of parts to avoid further damage	<ul style="list-style-type: none"> and workplace • Store tools and equipment 		Disc <ul style="list-style-type: none"> • Use of Video Compact Disc and Digital Video Disc • Parts of Video Compact Disc and Digital video Disc and their functions • Possible faults in Video Compact Disc and Digital Video Disc Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> • Safety precautions in servicing Digital Video Disc and Video Compact Disc • Safe handling of tools and equipment. 		
		(b) Servicing optical system	Brainstorm: Guide students to understand the function and components of the	<ul style="list-style-type: none"> • Identify parts of Digital Video Disc (DVD) and Video 	Serviced Digital Video Disc (DVD) and Video Compact Disc	Knowledge evidence: Detailed knowledge of: Method used: The	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Video Compact 	14

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>optical system in VCD and DVD players. Discuss potential issues like misalignment or dirt on lenses that can affect performance</p> <p>Practical Work: Guide the students to service the optical system, including cleaning the lenses, checking the laser alignment, and testing the optical pickup.</p> <p>Hands-On Practice: In manageable groups, students will diagnose and service faulty VCD or DVD players with optical issues. Have them cleaning lenses, realigning the laser, and</p>	<p>Compact Disc (VCD)</p> <ul style="list-style-type: none"> Select tools, equipment and components Perform soldering Troubleshoot Digital Video Disc (DVD) and Video Compact Disc (VCD) Replace faulty components Test Digital Video Disc and Video Compact Disc circuits Observe safety precautions Clean tools, equipment and workplace Store tools and equipment 	(VCD) function according to manufacturer's specifications.	<p>student should explain procedures of servicing Digital Video Disc and Video Compact Disc</p> <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> Diagnosing Video Compact Disc and Digital Video Disc Performing soldering Testing serviced Digital Video Disc and Video Compact Disc <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> The difference between Digital Video Disc and Video Compact Disc Use of Video Compact Disc and Digital Video Disc Parts of Video 	<p>Disc or Digital Video Disc</p> <ul style="list-style-type: none"> Digital or analogue multimeters Oscilloscope Tool kit Work bench Work bench light Magnifying light Soldering iron Gloves Overcoat/Overall Boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			replacing damaged components while adhering to safety guidelines			Compact Disc and Digital video Disc and their functions <ul style="list-style-type: none"> Possible faults in Video Compact Disc and Digital Video Disc Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions in servicing Digital Video Disc and Video Compact Disc Safe handling of tools and equipment. 		
		(c) Servicing control system	Brainstorm: Guide students to define the control system in VCD and DVD players and explain its role in managing the player's functions. Discuss common issues such as	<ul style="list-style-type: none"> Identify parts of Digital Video Disc (DVD) and Video Compact Disc. (VCD) Select tools, equipment and components 	Serviced Digital Video Disc (DVD) and Video Compact Disc (VCD) function according to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain procedures of servicing Digital Video Disc and Video Compact Disc Principles: The	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Video Compact Disc or Digital Video Disc Digital or analogue multimeters Oscilloscope 	14

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>unresponsive controls and faulty buttons.</p> <p>Practical Work: Guide the students to service the control system, including inspecting the microprocessor, wiring, and buttons.</p> <p>Hands-On Practice: Divide students into manageable groups, providing them with VCD or DVD players with control system issues. Assign tasks of testing the microprocessor and checking button connections</p>	<ul style="list-style-type: none"> • Perform soldering • Troubleshoot Digital Video Disc (DVD) and Video Compact Disc (VCD) • Replace faulty components • Test Digital Video Disc and Video Compact Disc circuits • Observe safety precautions • Clean tools, equipment and workplace • Store tools and equipment 		<p>student should explain the principles of:</p> <ul style="list-style-type: none"> • Diagnosing Video Compact Disc and Digital Video Disc • Performing soldering • Testing serviced Digital Video Disc and Video Compact Disc <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • The difference between Digital Video Disc and Video Compact Disc • Use of Video Compact Disc and Digital Video Disc • Parts of Video Compact Disc and Digital video Disc and their functions • Possible faults in Video Compact 	<ul style="list-style-type: none"> • Tool kit • Work bench • Work bench light • Magnifying light • Soldering iron • Gloves • Overcoat/Overall • Boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						Disc and Digital Video Disc Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions in servicing Digital Video Disc and Video Compact Disc Safe handling of tools and equipment. 		
	4.6 Installing Closed Circuit Television Systems	(a) Installing Closed Circuit Television power supply	Brainstorm: Define Closed Circuit Television (CCTV) power supply and its importance in ensuring stable power to cameras and equipment. Practical Work: Guide the students to install a CCTV power supply, focusing on wiring, voltage checking, and	<ul style="list-style-type: none"> Select tools, equipment and components Install Closed Circuit Television power supply 	Install Closed Circuit Television to function according to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain procedures of installing a Closed-Circuit Television systems Principles: The student should explain the principles of: <ul style="list-style-type: none"> Installing a Closed-Circuit 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Telecommunication kit Satellite finder (path finder) Angle finder Set of spanners Field strength meter LAN cable Tester Digital Multimeter Portable signal monitor Crimping Tool 	8

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			compatibility. Hands-On Practice: Students work in groups to install CCTV power supplies, ensuring correct wiring and safe operation. Have them troubleshoot issues and ensure the system is installed safely and effectively.			Television power supply • Operating system of Closed-Circuit Television monitor		
		(b) Identifying Installation cables	Brainstorm: Guide students in identifying various types of installation cables used in CCTV systems, such as coaxial, Ethernet, and power cables, and explain their roles in system performance. Practical Work: Guide the students to select and test	<ul style="list-style-type: none"> Select tools, equipment and components Identifying Installation of cables 	Install Closed Circuit Television to function according to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain procedures of installing a Closed-Circuit Television systems Principles: The student should explain the principles of: <ul style="list-style-type: none"> Installing a 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Telecommunication kit Satellite finder (path finder) Angle finder Set of spanners Field strength meter LAN cable Tester Digital Multimeter Portable signal monitor 	8

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			appropriate cables for different CCTV components Hands-On Practice: Organise students into manageable groups to practice identifying, testing, and measuring cables for CCTV installation.			Closed-Circuit Television camera <ul style="list-style-type: none"> Installing Closed Circuit Television decoder Troubleshooting Closed Circuit Television camera 	<ul style="list-style-type: none"> Crimping Tool 	
		(c) Installing Closed Circuit Television wireless system	Brainstorm: Guide students to explain the concept of wireless CCTV systems, explaining their components, benefits, and installation considerations. Practical Work: Guide the students to install wireless CCTV systems, including camera	<ul style="list-style-type: none"> Select tools, equipment and components Installing Closed Circuit Television wireless systems 	Install Closed Circuit Television to function according to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain procedures of installing a Closed-Circuit Television systems Principles: The student should explain the principles of: <ul style="list-style-type: none"> Installing a Closed-Circuit Television 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Telecommunication kit Satellite finder (path finder) Angle finder Set of spanners Field strength meter LAN cable Tester Digital Multimeter Portable signal monitor Crimping Tool 	8

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			placement, router configuration, and system connection. Hands-On Practice: In manageable groups, have students install a wireless CCTV system, focusing on camera placement, configuring wireless routers, and troubleshooting signal issues ensuring proper installation and functionality.			wireless system • Troubleshooting Closed Circuit Television wireless system		
		(d) Installing Closed Circuit Television decoder	Brainstorm: Define the CCTV decoder and explain its role in converting video signals for display or recording. Practical Work: Guide the students	<ul style="list-style-type: none"> Select tools, equipment and components Installing Closed Circuit Television decoder 	Install Closed Circuit Television to function according to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain procedures of installing a Closed Circuit Television systems	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Telecommunication kit Satellite finder (path finder) Angle finder Set of spanner 	8

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			to install a CCTV decoder, covering connections to cameras, displays, and recording devices. Hands-On Practice: Organise students into manageable groups to install and configure CCTV decoders in a mock setup.			Principles: The student should explain the principles of: <ul style="list-style-type: none"> • Closed Circuit Television decoder • Troubleshooting Closed Circuit Television decoder 	<ul style="list-style-type: none"> • Field strength meter • LAN cable Tester • Digital Multimeter • Portable signal monitor • Crimping Tool 	
		(e) Operating Television Closed Circuit monitor	Brainstorm: Guide students to define the function of a television closed-circuit monitor within CCTV systems, explaining its role in surveillance. Practical Work: Guide the students to operate a CCTV monitor, covering adjustments for brightness,	<ul style="list-style-type: none"> • Select tools, equipment and components • Operating Closed Circuit Television monitor 	Install Closed Circuit Television to function according to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain procedures of installing a Closed-Circuit Television systems Principles: The student should explain the principles of: <ul style="list-style-type: none"> • Operating system of Closed-Circuit Television 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Telecommunication kit • Satellite finder (path finder) • Angle finder • Set of spanners • Field strength meter • LAN cable Tester • Digital Multimeter • Portable signal monitor • Crimping Tool 	8

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			contrast, and input channels. Hands-On Practice: Divide students into manageable groups, providing them with CCTV monitor setups. Assign tasks of adjusting settings, ensuring camera connections, and troubleshooting display problems.			monitor • Troubleshooting Closed Circuit Television monitor		
		(f) Troubleshooting Closed Circuit Television camera	Brainstorm: Guide students to define CCTV cameras and their role in surveillance systems. Discuss common issues such as poor image quality, signal loss, and camera malfunctions Practical Work: Guide the students	<ul style="list-style-type: none"> Select tools, equipment and components Troubleshooting Closed Circuit Television camera 	Install Closed Circuit Television to function according to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain procedures of installing a Closed-Circuit Television systems Principles: The student should explain the principles of: <ul style="list-style-type: none"> Closed Circuit 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Telecommunication kit Satellite finder (path finder) Angle finder Set of spanners Field strength meter LAN cable Tester Digital Multimeter Portable signal monitor 	8

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			to troubleshoot CCTV cameras by inspecting connections, adjusting settings like focus, and using diagnostic tools to identify faults Hands-On Practice: Organise students into manageable groups and provide malfunctioning CCTV cameras for them to troubleshoot.			<ul style="list-style-type: none"> Television camera Troubleshooting Closed Circuit Television camera 	<ul style="list-style-type: none"> Crimping Tool 	
	4.7 Servicing Smart Tv	(a) Installing internet on smart TV	Brainstorm: Guide students to define the process of installing the internet on a smart TV and discuss network options such as Wi-Fi or Ethernet Practical Work: Guide the students to connect a smart	<ul style="list-style-type: none"> Servicing smart Television Repair LCD Television Repair LED Television Repair Plasma 	Service smart TV to function according to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain procedures of installing a CCTV systems Principles: The student should explain the principles	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Smart TV trainer kit Television repair Dongle Measuring Instrument LCD TV backlight tester LED TV backlight 	10

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			TV to the internet. Hands-On Practice: Organise students into manageable groups and assign them the task of setting up internet connections via Wi-Fi or Ethernet.			of: - -Servicing smart Television -Repair LCD TV -Repair LED TV Repair Plasma TV	tester	
		(b) Troubleshooting smart TV hardware	Braintstorm: Guide students to define the common hardware components of a smart TV, and discuss potential hardware issues. Practical Work: Guide students to troubleshoot a smart TV hardware Hands-On Practice: Organise students into manageable groups and	<ul style="list-style-type: none"> • Servicing smart Television • Repair LCD Television • Repair LED Television • Repair Plasma 	Service smart TV to function according to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain procedures of installing a CCTV systems Principles: The student should explain the principles of: - -Servicing smart Television -Repair LCD TV -Repair LED TV Repair Plasma TV	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Smart TV trainer kit • Television repair Dongle • Measuring Instrument • LCD TV backlight tester LED TV backlight tester	12

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			provide them with smart TVs exhibiting hardware issues and assign them with task of diagnosing problems, testing components, and replacing or repairing faulty hardware.					
		(c) Repairing smart TV software	<p>Brainstorm: Guide students to define smart TV software and its key components, such as the operating system, apps, and firmware. Discuss common software issues like unresponsive apps, system crashes, or outdated firmware.</p> <p>Practical Work: Guide students to repair a smart TV</p>	<ul style="list-style-type: none"> • Servicing smart Television • Repair LCD Television • Repair LED Television • Repair Plasma 	Service smart TV to function according to manufacturer's specifications.	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain procedures of installing a CCTV systems Principles: The student should explain the principles of: -Servicing smart Television -Repair LCD TV -Repair LED TV Repair Plasma TV</p>	<p>The following tools, equipment and safety gear should be available:</p> <ul style="list-style-type: none"> • Smart TV trainer kit • Television repair Dongle • Measuring Instrument • LCD TV backlight tester <p>LED TV backlight tester</p>	12

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>software, including resetting the TV, reinstalling or updating firmware, and troubleshooting app issues.</p> <p>Hands-On Practice: Divide students into manageable groups and provide them with smart TVs facing software issues. Assign tasks such as performing factory resets, updating firmware, reinstalling apps, and troubleshooting connectivity or performance problems.</p>					
5.0 Building IC Circuits	5.1 Constructing Operational	(a) Building photo switching circuit	Brainstorm: Guide students to define a photo-switching circuit	<ul style="list-style-type: none"> Select tools, equipment and electronic components 	Constructed circuit functions as per technical	Knowledge evidence: Detailed knowledge of:	The following tools, equipment and safety gear should be available:	26

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
	Amplifier (OP AMP) Circuits		<p>and its purpose.</p> <p>Practical Work: Guide the students to build a photo-switching circuit.</p> <p>Hands-On Practice: Organise students into manageable groups and assign them the task of assembling and testing a photo-switching circuit. Have the student record the observation how the circuit responds to changes in light and make adjustments to improve its performance</p>	<ul style="list-style-type: none"> Construct circuit using operational amplifier Test performance of circuit Record test results Interpret test results Observe safety regulations 	specifications.	<p>Method used: The student should explain how to construct electronic circuits using operational amplifiers</p> <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> Identifying IC pins Connecting ICs <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> Difference between integrated circuit and discrete component circuit Advantages of using integrated circuits (ICs) Applications of operational amplifier ICs Photo switching circuit Temperature sensitive 	<ul style="list-style-type: none"> Signal generator Digital or analogue multimeters Oscilloscope Power supply unit Tool kit Work bench Gloves Boots Overall/Overcoat 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						switching circuit Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions in electronics work Safe handling of tools, equipment and components. 		
		(b) Building temperature-sensitive switching circuit.	Brainstorm: Guide students to define a temperature-sensitive switching circuit and its applications. Practical Work: Guide the students to build a temperature-sensitive switching circuit. Hands-On Practice: Organise students into manageable groups and assign them the task of	<ul style="list-style-type: none"> Select tools, equipment and electronic components Construct circuit using operational amplifier Test performance of circuit Record test results Interpret test results Observe safety regulations 	Constructed circuit functions as per technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to construct electronic circuits using operational amplifiers Principles: The student should explain the principles of: <ul style="list-style-type: none"> Identifying IC pins Connecting ICs Theories: The student should explain:	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Signal generator Digital or analogue multimeters Oscilloscope Power supply unit Tool kit Work bench Gloves Boots Overall/Overcoat 	27

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			assembling and testing a temperature-sensitive switching circuit.			<ul style="list-style-type: none"> • Difference between integrated circuit and discrete component circuit • Advantages of using integrated circuits (ICs) • Applications of operational amplifier ICs • Photo switching circuit • Temperature sensitive switching circuit Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> • Safety precautions in electronics work • Safe handling of tools, equipment and components. 		
	5.2 Constructing Integrated Amplifier Circuits	(a) Building waveform generator	Brainstorm: Guide students to define a waveform generator and its	<ul style="list-style-type: none"> • Select tools, equipment and electronic components • Construct 	Constructed Integrated Circuit (IC) amplifier circuit	Knowledge evidence: Detailed knowledge of: Method used: The	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Signal generator 	16

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>types and applications.</p> <p>Practical Work: Guide the students to build a basic waveform generator circuit using components like operational amplifiers, resistors, and capacitors.</p> <p>Hands-On Practice: Organise students into manageable groups and assign them the task of building and testing a waveform generator.</p>	<p>waveform generator</p> <ul style="list-style-type: none"> • Test circuit • Record test results • Interpret test results • Observe safety regulations 	functions as per technical requirements.	<p>student should explain how to construct amplifier circuits using Integrated Circuit (IC)s</p> <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Diagnosing Integrated Circuit (IC) pins • Connecting Integrated Circuit (IC)s <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Advantages of integrated circuits over discrete component circuits • Types of Integrated Circuit (IC)s and their functions • Importance of 	<ul style="list-style-type: none"> • Digital and analogue multimeters • Oscilloscope • Power supply unit • Tool kit • Integrated Circuit (IC) data book • Work bench • Gloves • Boots • Overall/Overcoat 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						using heat sinks <ul style="list-style-type: none"> Importance of Integrated Circuit (IC) data book Parts of integrated circuits and their functions Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions in electronics work Safe handling of tools, equipment and components. 		
		(b) Building audio amplifier circuit	Brainstorm: Guide students to define an audio amplifier circuit and its purpose. Practical Work: Guide the students to build an audio amplifier circuit using essential components. Hands-On Practice:	<ul style="list-style-type: none"> Select tools, equipment and electronic components Construct Integrated Circuit (IC) amplifier circuit Test circuit Record test results Interpret test results Observe safety 	Constructed Integrated Circuit (IC) amplifier circuit functions as per technical requirements.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to construct amplifier circuits using Integrated Circuit (IC)s Principles: The student should explain the principles	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Signal generator Digital and analogue multimeters Oscilloscope Power supply unit Tool kit Integrated Circuit (IC) data book Work bench 	16

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			Organise students into manageable groups, provide them with circuit diagrams and components, and assign the task of building an audio amplifier	regulations		of: <ul style="list-style-type: none"> Diagnosing Integrated Circuit (IC) pins Connecting Integrated Circuit (IC)s Theories: The student should explain: <ul style="list-style-type: none"> Advantages of integrated circuits over discrete component circuits Types of Integrated Circuit (IC)s and their functions Importance of using heat sinks Importance of Integrated Circuit (IC) data book Parts of integrated amplifier circuits and their functions Circumstantial knowledge:	<ul style="list-style-type: none"> Gloves Boots Overall/Overcoat 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions in electronics work Safe handling of tools, equipment and components. 		
		(c) Building radio transmitter and receiver	Brainstorm: Guide students to define radio transmitters and receivers, explaining their purpose in wireless communication. Discuss the basic principles of transmission and reception, including modulation and demodulation. Identify common components that makes up transmitter and receiver Practical Work: Guide students to	<ul style="list-style-type: none"> Select tools, equipment and electronic components Construct radio transmitter and receiver Test circuit Record test results Interpret test results Observe safety regulations 	Constructed Integrated Circuit (IC) amplifier circuit functions as per technical requirements.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to construct radio transmitter and receiver Principles: The student should explain the principles of: <ul style="list-style-type: none"> Diagnosing Integrated Circuit (IC) pins Connecting Integrated Circuit (IC)s Theories: The student should explain: <ul style="list-style-type: none"> Advantages of 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Signal generator Digital and analogue multimeters Oscilloscope Power supply unit Tool kit Integrated Circuit (IC) data book Work bench Gloves Boots Overall/Overcoat 	16

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			build a simple radio transmitter and receiver circuit. Hands-On Practice: Organise students into manageable groups, provide them with circuit diagrams, components, and tools, and have them building a basic radio transmitter and receiver pair. Have them test the circuits by transmitting a signal and receiving it on the paired receiver, troubleshooting any issues to ensure proper functionality			integrated circuits over discrete component circuits <ul style="list-style-type: none"> Types of Integrated Circuit (IC)s and their functions Importance of using heat sinks Importance of Integrated Circuit (IC) data book Parts of radio receiver and transmitter and their functions Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions in electronics work Safe handling of tools, equipment and components. 		
6.0 Performing basic maintenance of	6.1 Carrying out Basic Diagnosis of Mobile	(a) Describing hardware architecture of mobile phone	Brainstorm: Guide students to discuss the hardware	<ul style="list-style-type: none"> Perform basic mobile phone repair work Troubleshoot 	Maintain mobile Phone to function according to	Knowledge evidence: Detailed knowledge of:	The following tools, equipment and safety gear should be available:	11

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
mobile phone	Phone		<p>architecture of a mobile phone, outlining its main components and their functions.</p> <p>Practical Work: Guide students to identify and label various hardware components in a disassembled mobile phone.</p> <p>Hands-On Practice: Provide students with disassembled mobile phones and have them identifying and describing the function of each component.</p>	<p>ng and repair mobile phone hardware parts</p> <ul style="list-style-type: none"> • Servicing electronic portable mobile device • Repair fault smart watch 	manufacturer's specifications.	<p>Method used: The student should explain procedures of maintaining mobile phones hardware and software</p> <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Performing mobile phone repair • Troubleshooting and repair hardware part of a mobile phone • Servicing electronic portable mobile devices • Repairing fault smart watch 	<ul style="list-style-type: none"> • Trinocular microscope • SMD rework station • Infrared rework station • Software boxes • Software Dongles • Data cables • LCD separator machine • Personal computer • Electronic tool kit 	
		(b) Describing software architecture of mobile phone	<p>Brainstorm: Guide students to define the software architecture of a mobile phone, highlighting key layers. Discuss</p>	<ul style="list-style-type: none"> • Perform basic mobile phone repair work • Perform mobile phone software repair work • Servicing 	Maintain mobile Phone to function according to manufacturer's specifications.	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain procedures of maintaining mobile</p>	<p>The following tools, equipment and safety gear should be available:</p> <ul style="list-style-type: none"> • Trinocular microscope • SMD rework station 	11

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>the role of each layer in managing hardware resources and providing user functionality.</p> <p>Practical Work: Guide students to analyse a mobile phone's software architecture by exploring its OS and installed applications.</p> <p>Hands-On Practice: Provide students with mobile phones or emulators to explore the software layers and assign tasks such as identifying the OS type, listing middleware components, and examining application</p>	<p>electronic portable mobile device</p> <ul style="list-style-type: none"> Repair fault smart watch 		<p>phones hardware and software</p> <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> Performing mobile phone repair Troubleshooting and repair software part of a mobile phone Servicing electronic portable mobile devices Repairing fault smart watch 	<ul style="list-style-type: none"> Infrared rework station Software boxes Software Dongles Data cables LCD separator machine Personal computer Electronic tool kit 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			permissions.					
		(c) Identifying dedicated chips	<p>Brainstorm: Guide students to define dedicated chips in a mobile phone. Discuss the function of each chip in enabling specific tasks.</p> <p>Practical Work: Guide the students to identify dedicated chips in a mobile phone by opening up a phone or using technical diagrams and schematics.</p> <p>Hands-On Practice: Organise students into manageable groups and give them mobile phones or technical schematics.</p>	<ul style="list-style-type: none"> Perform basic mobile phone repair work Troubleshooting and repair mobile phone hardware parts Perform mobile phone software repair work Servicing electronic portable mobile device Repair fault smart watch 	Maintain mobile Phone to function according to manufacturer's specifications.	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain procedures of maintaining mobile phones hardware and software Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> Performing mobile phone repair Troubleshooting and repair hardware and software part of a mobile phone Servicing electronic portable mobile devices Repairing fault smart watch 	<p>The following tools, equipment and safety gear should be available:</p> <ul style="list-style-type: none"> Trinocular microscope SMD rework station Infrared rework station Software boxes Software Dongles Data cables LCD separator machine Personal computer Electronic tool kit 	8

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			Assign each group the task of identifying different dedicated chips and their functions.					
		(d) Locating various sensors	<p>Brainstorm: Guide students to define sensors used in mobile phones. Explain the role of each sensor in enhancing the functionality of mobile phones.</p> <p>Practical Work: Guide the students to locate various sensors in a mobile phone, using diagrams or technical documentation. Demonstrate how to identify sensors on the phone's motherboard or PCB and explain their positioning.</p>	<ul style="list-style-type: none"> Perform basic mobile phone repair work Troubleshooting and repair mobile phone hardware parts Servicing electronic portable mobile device Repair fault smart watch 	Maintain mobile Phone to function according to manufacturer's specifications.	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain procedures of maintaining mobile phones hardware and software</p> <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> Performing mobile phone repair Troubleshooting and repair parts of a mobile phone Servicing electronic portable mobile 	<p>The following tools, equipment and safety gear should be available:</p> <ul style="list-style-type: none"> Trinocular microscope SMD rework station Infrared rework station Software boxes Software Dongles Data cables LCD separator machine Personal computer Electronic tool kit 	8

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			Hands-On Practice: Organise students into manageable groups and provide them with mobile phones (or technical schematics). Assign each group the task of locating different sensors and understanding their functions.			devices <ul style="list-style-type: none"> Repairing fault smart watch 		
		(e) Identifying internal mobile phone accessories	Brainstorm: Guide students to define and understand the various internal accessories in a mobile phone. Discuss the role of each accessory in the phone's operation and functionality. Practical Work: Guide the students to disassemble a mobile phone	<ul style="list-style-type: none"> Perform basic mobile phone repair work Troubleshooting and repair mobile phone hardware parts Perform mobile phone software repair work Servicing electronic portable mobile device 	Maintain mobile Phone to function according to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain procedures of maintaining mobile phones hardware and software Principles: The student should explain the principles of: <ul style="list-style-type: none"> Performing mobile phone repair 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Trinocular microscope SMD rework station Infrared rework station Software boxes Software Dongles Data cables LCD separator machine Personal computer Electronic tool kit 	9

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			safely to locate and identify its internal accessories. Hands-On Practice: Organise students into manageable groups and provide them with mobile phones to disassemble and identify internal accessories. Have students document the location and function of each component, and guide them in testing the functionality.	<ul style="list-style-type: none"> Repair fault smart watch 		<ul style="list-style-type: none"> Troubleshooting and repair hardware and software part of a mobile phone Servicing electronic portable mobile devices Repairing fault smart watch		
	6.2 Performing Basic Mobile Phone Troubleshooting	(a) Troubleshooting the phone which does not turn on	Brainstorm: Guide students to define and explore common reasons why a mobile phone may not turn on. Practical Work:	<ul style="list-style-type: none"> Identify SMD components Test and record characteristics of SMD components Solder SMD components 	Troubleshoot and repair mobile phone to function according to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain procedures of troubleshooting and repairing of mobile	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Trinocular microscope SMD rework station Infrared rework 	11

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			Guide students to troubleshoot a phone that does not turn on. Demonstrate how to check for common problems, such as testing the battery, inspecting the power button, and verifying the charging port with a multimeter. Hands-On Practice: Organise students into manageable groups, provide them with phones that do not turn on and assign each group the task of diagnosing the issue and performing the necessary troubleshooting steps.	on circuit board		phone Principles: The student should explain the principles of: <ul style="list-style-type: none"> • Troubleshooting mobile phone not turning on • Troubleshooting mobile phone charging system • Diagnosing the problem of a phone not receiving income calls • Troubleshooting mobile phone signals 	station <ul style="list-style-type: none"> • Multimeter with SMD testing probe • Soldering station • Tweezers • Oscilloscope 	
		(b) Identifying mobile phone charging system	Brainstorm: Guide students to define the mobile	<ul style="list-style-type: none"> • Identify SMD components • Test and 	Troubleshoot and repair mobile phone	Knowledge evidence: Detailed knowledge	The following tools, equipment and safety gear should be	11

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			phone charging system, explaining its key components. Practical Work: Guide the students to identify and inspect the charging system in a mobile phone. Hands-On Practice: Organise students into manageable groups and assign tasks of identifying faulty charging cables, testing the charging port, checking the battery's health, and diagnosing charging IC problems.	record characteristic s of SMD components <ul style="list-style-type: none"> Solder SMD components on circuit board 	to function according to manufacturer' s specifications.	of: Method used: The student should explain procedures of troubleshooting and repairing of mobile phone Principles: The student should explain the principles of: <ul style="list-style-type: none"> Troubleshooting mobile phone not turning on Troubleshooting mobile phone charging system Diagnosing the problem of a phone not receiving income calls Troubleshooting mobile phone signals	available: <ul style="list-style-type: none"> Trinocular microscope SMD rework station Infrared rework station Multimeter with SMD testing probe Soldering station Tweezers Oscilloscope 	
		(c) Diagnosing the problem of phone not receiving income calls	Brainstorm: Guide students to define the issue of a mobile phone not receiving incoming calls,	<ul style="list-style-type: none"> Identify SMD components Test and record characteristic s of SMD 	Troubleshoot and repair mobile phone to function according to manufacturer'	Knowledge evidence: Detailed knowledge of: Method used: The student should	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Trinocular microscope 	11

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			highlighting possible causes Practical Work: Guide the students to troubleshoot the phone's inability to receive incoming calls. Hands-On Practice: Divide students into manageable groups and have them troubleshoot phones that are experiencing issues with receiving incoming calls.	components <ul style="list-style-type: none"> Solder SMD components on circuit board 	s specifications.	explain procedures of troubleshooting and repairing of mobile phone Principles: The student should explain the principles of: <ul style="list-style-type: none"> Troubleshooting mobile phone not turning on Troubleshooting mobile phone charging system Diagnosing the problem of a phone not receiving income calls Troubleshooting mobile phone signals	<ul style="list-style-type: none"> SMD rework station Infrared rework station Multimeter with SMD testing probe Soldering station Tweezers Oscilloscope 	
		(d) Troubleshooting mobile phone signals	Brainstorm: Guide students to define mobile phone signal issues and discuss the factors affecting signal strength. Practical Work: Guide the students	<ul style="list-style-type: none"> Identify SMD components Test and record characteristic s of SMD components Solder SMD components on circuit board 	Troubleshoot and repair mobile phone to function according to manufacturer' s specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain procedures of troubleshooting and repairing of mobile phone	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Trinocular microscope SMD rework station Infrared rework station Multimeter with 	11

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>to troubleshoot mobile phone signal issues.</p> <p>Hands-On Practice: Organise students into manageable groups and provide them with phones with signal issues and assign tasks diagnose the cause of the problem and practice troubleshooting techniques.</p>			<p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Troubleshooting mobile phone not turning on • Troubleshooting mobile phone charging system • Diagnosing the problem of a phone not receiving income calls • Troubleshooting mobile phone signals 	<p>SMD testing probe</p> <ul style="list-style-type: none"> • Soldering station • Tweezers • Oscilloscope 	

Form Four

Table 6: Detailed Contents for Form Four

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
1.0 Servicing Personal Computers	1.1 Operating Personal Computers	(a) Assembling personal computer system	<p>Brainstorm: Facilitate group discussions to generate ideas about essential components and their functions in a personal computer system</p> <p>Practical Work: Guide the students in hands-on assembly of a personal computer system, including installing hardware and connecting peripherals</p> <p>Hands-On Practice: organise students in manageable groups, provide</p>	<ul style="list-style-type: none"> Select tools and equipment Assemble personal computer system Disassemble personal computer system Power personal computer system Observe safety precautions Clean tools, equipment and workplace Store tools and equipment 	Operated personal computer functions as per the manufacturer's specifications.	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to operate personal computer</p> <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> Operating personal computer Testing P.C. (Personal computer) <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> Peripherals of personal computer Types of computers Use of personal 	<p>The following tools, equipment and safety gear should be available:</p> <ul style="list-style-type: none"> Personal computer Digital and analogue multimeters Oscilloscope Tool kit Work bench Work bench light Gloves Overcoat / overall Boots 	48

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			them with parts of a computer and have them assemble and test the computer.			computer <ul style="list-style-type: none"> Components of personal computer and their functions Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions when operating personal computer Safe handling of tools and equipment. 		
		(b) Testing functionality of computer	Brainstorm: Facilitate a discussion to identify common tests and tools used to verify the functionality of a computer system. Practical Work: Guide students in performing diagnostic tests, such as checking BIOS settings,	<ul style="list-style-type: none"> Select tools and equipment Power personal computer system Test functionality of personal computer Observe safety precautions Clean tools, 	Operated personal computer functions as per the manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to operate personal computer Principles: The student should explain the principles of: <ul style="list-style-type: none"> Operating personal 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Personal computer Digital and analogue multimeters Oscilloscope Tool kit Work bench Work bench light Gloves Overcoat / overall Boots 	30

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>running hardware diagnostics, and verifying software installations.</p> <p>Hands-On Practice: Organise students into manageable groups, provide them with assembled computers, and have them conduct functionality tests and troubleshoot any issues identified</p>	<p>equipment and workplace</p> <ul style="list-style-type: none"> • Store tools and equipment 		<p>computer</p> <ul style="list-style-type: none"> • Testing P.C. (Personal computer) <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Peripherals of personal computer • Types of computers • Use of personal computer • Components of personal computer and their functions <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> • Safety precautions when operating personal computer • Safe handling of tools and equipment. 		
	1.2 Servicing Computer	(a) Troubleshooting power supply	Brainstorm: Facilitate a	<ul style="list-style-type: none"> • Dismantle computer set 	Serviced computer	Knowledge evidence:	The following tools,	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	Knowledge Assessment		
	Hardware		<p>discussion to identify common power supply issues and their symptoms in a computer system.</p> <p>Practical Work: Guide students in using tools like multimeters to test and diagnose power supply faults in a computer.</p> <p>Hands-On Practice: Organise students into manageable groups, provide them with faulty and functional power supplies, and have them identify and troubleshoot the issues</p>	<ul style="list-style-type: none"> • Troubleshoot parts of computer • Replace faulty components • Assemble computer parts • Test computer hardware • Interpret computer self-tests • Observe safety precautions • Clean tools, equipment and workplace <p>Store tools, equipment and safety gear.</p>	functions according to manufacturer's specifications.	<p>Detailed knowledge of: Method used: The student should explain how to maintain computer hardware Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Maintaining computer hardware • Test computer hardware • Dismantling and assembling computer hardware <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Difference between hardware and software • Types of computer hardware • Ways of connecting 	<p>equipment and safety gear should be available:</p> <ul style="list-style-type: none"> • Computer set • Digital analogue multimeters • Oscilloscope • Tool kit • Work bench • Work bench light • Gloves • Overcoat / Overall • Boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						computer hardware <ul style="list-style-type: none"> • Use of computer hardware Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> • Safety precautions during servicing computer hardware • Safe handling of tools and equipment. 		
		(b) Troubleshooting mother board	Brainstorm: Facilitate a discussion to identify common motherboard issues and their potential causes. Practical Work: Guide students in diagnosing and resolving motherboard problems using	<ul style="list-style-type: none"> • Dismantle computer set • Troubleshoot parts of computer • Replace faulty components • Assemble computer parts • Test computer hardware 	Serviced computer functions according to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to maintain computer hardware Principles: The student should explain the principles of:	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Computer set • Digital analogue multimeters • Oscilloscope • Tool kit • Work bench • Work bench light • Gloves • Overcoat / Overall • Boots 	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	Knowledge Assessment		
			<p>tools like multimeters and diagnostic software.</p> <p>Hands-On Practice: Organise students into manageable groups, provide them with faulty motherboards, and have them identify, troubleshoot, and resolve the issues</p>	<ul style="list-style-type: none"> • Interpret computer self-tests • Observe safety precautions • Clean tools, equipment and workplace • Store tools, equipment and safety gear. 		<ul style="list-style-type: none"> • Maintaining computer hardware • Test computer hardware • Dismantling and assembling computer hardware <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Difference between hardware and software • Types of computer hardware • Ways of connecting computer hardware • Use of computer hardware <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> • Safety precautions 		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						during servicing computer hardware <ul style="list-style-type: none"> Safe handling of tools and equipment. 		
		(c) Troubleshooting expansion PCB	<p>Brainstorm: Facilitate a discussion on the functions of expansion PCBs and common issues that can affect their performance.</p> <p>Practical Work: Guide students in identifying and troubleshooting issues in expansion PCBs using diagnostic tools and software.</p> <p>Hands-On Practice: Organise students into manageable groups, provide</p>	<ul style="list-style-type: none"> Dismantle computer set Troubleshoot parts of computer Replace faulty components Assemble computer parts Test computer hardware Interpret computer self-tests Observe safety precautions Clean tools, equipment and 	Serviced computer functions according to manufacturer's specifications.	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to maintain computer hardware</p> <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> Maintaining computer hardware Test computer hardware Dismantling and assembling computer hardware <p>Theories: The student should</p>	<p>The following tools, equipment and safety gear should be available:</p> <ul style="list-style-type: none"> Computer set Digital analogue multimeters Oscilloscope Tool kit Work bench Work bench light Gloves Overcoat / Overall Boots 	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	Knowledge Assessment		
			them with faulty expansion PCBs, and have them diagnose, repair, and test the components	workplace Store tools, equipment and safety gear.		explain: <ul style="list-style-type: none"> • Difference between hardware and software • Types of computer hardware • Ways of connecting computer hardware • Use of computer hardware Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> • Safety precautions during servicing computer hardware • Safe handling of tools and equipment. 		
		(d) Checking hard disc drive	Brainstorm: Guide students to discuss the structure,	<ul style="list-style-type: none"> • Dismantle computer set • Troubleshoot parts of 	Serviced computer functions according to	Knowledge evidence: Detailed knowledge of:	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Computer set 	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	Knowledge Assessment		
			<p>functions, and common issues of a hard disc drive.</p> <p>Practical Work: Assist students in performing diagnostic tests on hard disc drives, including checking for errors and measuring performance.</p> <p>Hands-On Practice: Organise students into manageable groups, provide them with hard disc drives, and have them inspect, test, and document the results of the drive's functionality</p>	<p>computer</p> <ul style="list-style-type: none"> • Replace faulty components • Assemble computer parts • Test computer hardware • Interpret computer self-tests • Observe safety precautions • Clean tools, equipment and workplace <p>Store tools, equipment and safety gear.</p>	manufacturer's specifications.	<p>Method used: The student should explain how to maintain computer hardware</p> <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Maintaining computer hardware • Test computer hardware • Dismantling and assembling computer hardware <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Difference between hardware and software • Types of computer hardware • Ways of connecting 	<ul style="list-style-type: none"> • Digital analogue multimeters • Oscilloscope • Tool kit • Work bench • Work bench light • Gloves • Overcoat / Overall • Boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						computer hardware <ul style="list-style-type: none"> • Use of computer hardware Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> • Safety precautions during servicing computer hardware • Safe handling of tools and equipment. 		
		(e) Checking RAM	Brainstorm: Facilitate a discussion on the role of RAM in a computer system and common issues that can affect its performance. Practical Work: Guide students in testing RAM using diagnostic	<ul style="list-style-type: none"> • Dismantle computer set • Troubleshoot parts of computer • Replace faulty components • Assemble computer parts • Test computer hardware 	Serviced computer functions according to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to maintain computer hardware Principles: The student should explain the principles of:	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Computer set • Digital analogue multimeters • Oscilloscope • Tool kit • Work bench • Work bench light • Gloves • Overcoat / Overall • Boots 	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	Knowledge Assessment		
			<p>tools like memory testing software and checking physical installation.</p> <p>Hands-On Practice: Organise students into manageable groups, provide them with computer systems, and have them identify, test, and troubleshoot RAM-related issues</p>	<ul style="list-style-type: none"> • Interpret computer self-tests • Observe safety precautions • Clean tools, equipment and workplace <p>Store tools, equipment and safety gear.</p>		<ul style="list-style-type: none"> • Maintaining computer hardware • Test computer hardware • Dismantling and assembling computer hardware <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Difference between hardware and software • Types of computer hardware • Ways of connecting computer hardware • Use of computer hardware <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> • Safety precautions 		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						during servicing computer hardware <ul style="list-style-type: none"> Safe handling of tools and equipment. 		
		(f) Checking CD drives	<p>Brainstorm: Engage students in a discussion about the function of CD drives, their components, and common issues affecting their performance.</p> <p>Practical Work: Guide students in testing CD drives by connecting them to a computer, inserting discs, and verifying reading or writing functionality.</p> <p>Hands-On Practice:</p>	<ul style="list-style-type: none"> Dismantle computer set Troubleshoot parts of computer Replace faulty components Assemble computer parts Test computer hardware Interpret computer self-tests Observe safety precautions Clean tools, equipment and 	Serviced computer functions according to manufacturer's specifications.	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to maintain computer hardware</p> <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> Maintaining computer hardware Test computer hardware Dismantling and assembling computer hardware <p>Theories: The student should</p>	<p>The following tools, equipment and safety gear should be available:</p> <ul style="list-style-type: none"> Computer set Digital analogue multimeters Oscilloscope Tool kit Work bench Work bench light Gloves Overcoat / Overall Boots 	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	Knowledge Assessment		
			Organise students into manageable groups, provide them with CD drives and test discs, and have them diagnose and resolve any operational issues	workplace Store tools, equipment and safety gear.		explain: <ul style="list-style-type: none"> • Difference between hardware and software • Types of computer hardware • Ways of connecting computer hardware • Use of computer hardware Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> • Safety precautions during servicing computer hardware • Safe handling of tools and equipment. 		
	1.3 Installing Computer Peripherals	(a) Installing printer	Brainstorm: Guide students to discuss the various types of	<ul style="list-style-type: none"> • Select components and equipment 	Installed computer peripherals function as per	Knowledge evidence: Detailed knowledge of:	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Computer set 	21

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>printers, their installation processes, and common setup issues.</p> <p>Practical Work: Assist students in physically connecting the printer to a computer, installing drivers, and configuring the printer settings.</p> <p>Hands-On Practice: Organise students into manageable groups, provide them with printers, and have them install and test the printers on different operating systems</p>	<ul style="list-style-type: none"> • Install computer peripherals • Test computer input and output devices • Interpret standard results • Observe safety precautions • Clean tools, equipment and workplace • Store tools and equipment 	the manufacturer's specifications.	<p>Method used: The student should explain how to install computer peripherals</p> <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Installing computer peripherals • Testing functionality of peripherals <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Types of computer peripherals • Use of computer peripherals <p>Circumstantial knowledge:</p> <p>Detailed knowledge about:</p> <ul style="list-style-type: none"> • Safety precautions during installation of 	<ul style="list-style-type: none"> • Digital and analogue multimeters • Oscilloscope • Tool kit • Work bench • Work bench light • Gloves • Overcoat / Overall • Boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						computer peripherals <ul style="list-style-type: none"> Safe handling of tools, equipment and computer peripherals. 		
		(b) Installing scanner	<p>Brainstorm: Guide students to discuss the types of scanners, their connection methods, and common installation challenges.</p> <p>Practical Work: Guide students in connecting the scanner to a computer, installing the necessary drivers, and configuring the scanner settings.</p> <p>Hands-On Practice: Organise students into manageable</p>	<ul style="list-style-type: none"> Select components and equipment Install computer peripherals Test computer input and output devices Interpret standard results Observe safety precautions Clean tools, equipment and workplace Store tools and equipment 	Installed computer peripherals function as per the manufacturer's specifications.	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to install computer peripherals</p> <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> Installing computer peripherals Testing functionality of peripherals <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> Types of computer 	<p>The following tools, equipment and safety gear should be available:</p> <ul style="list-style-type: none"> Computer set Digital and analogue multimeters Oscilloscope Tool kit Work bench Work bench light Gloves Overcoat / Overall Boots 	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	Knowledge Assessment		
			groups, provide them with scanners, and have them install and test the scanner with different software.			peripherals <ul style="list-style-type: none"> • Use of computer peripherals Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> • Safety precautions during installation of computer peripherals • Safe handling of tools, equipment and computer peripherals. 		
		(c) Installing modems	Brainstorm: Guide students into a discussion on the different types of modems, their functions, and common installation issues. Practical Work: Guide students in physically	<ul style="list-style-type: none"> • Select components and equipment • Install computer peripherals • Test computer input and output devices • Interpret 	Installed computer peripherals function as per manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to install computer peripherals Principles: The student should explain the principles of:	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Computer set • Digital and analogue multimeters • Oscilloscope • Tool kit • Work bench • Work bench light • Gloves • Overcoat / Overall 	21

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			installing the modem, connecting it to the computer or network, and configuring necessary settings. Hands-On Practice: Organise students into manageable groups, provide them with modems, and have them install and test the modem's connectivity and functionality	standard results <ul style="list-style-type: none"> Observe safety precautions Clean tools, equipment and workplace Store tools and equipment 		<ul style="list-style-type: none"> Installing computer peripherals Testing functionality of peripherals Theories: The student should explain: <ul style="list-style-type: none"> Types of computer peripherals Use of computer peripherals Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions during installation of computer peripherals Safe handling of tools, equipment and computer peripherals. 	<ul style="list-style-type: none"> Boots 	
		(d) Installing digital camera	Brainstorm: Guide students in	<ul style="list-style-type: none"> Select components 	Installed computer	Knowledge evidence:	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	Knowledge Assessment		
			<p>discussing the various types of digital cameras, their connectivity options, and common installation steps.</p> <p>Practical Work: Assist students in connecting the digital camera to the computer, installing necessary drivers, and configuring the camera's settings.</p> <p>Hands-On Practice: Organise students into manageable groups, provide them with digital cameras, and have them install and test the camera's functionality with different software</p>	<p>and equipment</p> <ul style="list-style-type: none"> • Install computer peripherals • Test computer input and output devices • Interpret standard results • Observe safety precautions • Clean tools, equipment and workplace • Store tools and equipment 	peripherals function as per the manufacturer's specifications.	<p>Detailed knowledge of: Method used: The student should explain how to install computer peripherals Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Installing computer peripherals • Testing functionality of peripherals <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Types of computer peripherals • Use of computer peripherals <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> • Safety precautions 	<p>gear should be available:</p> <ul style="list-style-type: none"> • Computer set • Digital and analogue multimeters • Oscilloscope • Tool kit • Work bench • Work bench light • Gloves • Overcoat / Overall • Boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						during installation of computer peripherals <ul style="list-style-type: none"> Safe handling of tools, equipment and computer peripherals. 		
		(e) Installing speakers	Brainstorm: Guide students to define speaker and discuss the different types of speakers, their connectivity methods, and troubleshooting common installation issues. Practical Work: Guide students in connecting speakers to the computer, adjusting volume settings, and testing the sound	<ul style="list-style-type: none"> Select components and equipment Install computer peripherals Test computer input and output devices Interpret standard results Observe safety precautions Clean tools, equipment and 	Installed computer peripherals function as per the manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to install computer peripherals Principles: The student should explain the principles of: <ul style="list-style-type: none"> Installing computer peripherals Testing functionality of peripherals Theories: The student should	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Computer set Digital and analogue multimeters Oscilloscope Tool kit Work bench Work bench light Gloves Overcoat / Overall Boots 	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	Knowledge Assessment		
			output. Hands-On Practice: Organise students into manageable groups, provide them with speakers, and have them install, configure, and test the speakers' audio functionality	workplace • Store tools and equipment		explain: • Types of computer peripherals • Use of computer peripherals Circumstantial knowledge: Detailed knowledge about: • Safety precautions during installation of computer peripherals • Safe handling of tools, equipment and computer peripherals.		
	1.4 Installing Software	(a) Performing hard disc partitioning	Brainstorm: Facilitate a discussion on the purpose of hard disc partitioning, its benefits, and common partitioning tools.	<ul style="list-style-type: none"> • Select tools and equipment • Install software • Test functionality • Observe safety 	Installed computer software functions as per the manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to install computer software	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Computer set • Digital and analogue multimeters • Tool kit • Work bench 	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	Knowledge Assessment		
			<p>Practical Work: Guide students in using partitioning software to create, resize, and delete partitions on a hard disc drive.</p> <p>Hands-On Practice: Organise students into manageable groups, provide them with computers, and have them perform partitioning tasks on a designated hard disk while troubleshooting any issues</p>	<ul style="list-style-type: none"> precautions Clean tools, equipment and workplace Store tools and equipment. 		<p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> Installing software to computer Testing functionality of software <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> Meaning of software Types of computer software Uses of software <p>Circumstantial knowledge:</p> <p>Detailed knowledge about:</p> <ul style="list-style-type: none"> Safety precautions when installing software Safe handling of software, tools and equipment. 	<ul style="list-style-type: none"> Work bench light Gloves Overcoat/overall Boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
		(b) Installing operating systems	<p>Brainstorm: Guide students into defining operation systems and discussion on the different types of operating systems, their installation requirements, and common installation challenges.</p> <p>Practical Work: Guide students through the process of installing an operating system from a bootable USB or disc, including partitioning and driver installation.</p> <p>Hands-On Practice: Organise students into manageable groups, provide</p>	<ul style="list-style-type: none"> • Select tools and equipment • Install software • Test functionality • Observe safety precautions • Clean tools, equipment and workplace • Store tools and equipment. 	Installed computer software functions as per the manufacturer's specifications.	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to install computer software</p> <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Installing software to computer • Testing functionality of software <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Meaning of software • Types of computer software • Uses of software <p>Circumstantial knowledge:</p>	<p>The following tools, equipment and safety gear should be available:</p> <ul style="list-style-type: none"> • Computer set • Digital and analogue multimeters • Tool kit • Work bench • Work bench light • Gloves • Overcoat/overall • Boots 	26

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			them with installation media, and have them perform an OS installation on a computer, troubleshooting any issues that arise			Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions when installing software Safe handling of software, tools and equipment. 		
		(c) Installing drivers	Brainstorm: Facilitate students to discuss the role of drivers in system functionality, the types of drivers required for different hardware components, and how to troubleshoot driver installation issues. Practical Work: Guide students through the process of installing drivers	<ul style="list-style-type: none"> Select tools and equipment Install software Test functionality Observe safety precautions Clean tools, equipment and workplace Store tools and equipment. 	Installed computer software functions as per the manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to install computer software Principles: The student should explain the principles of: <ul style="list-style-type: none"> Installing software to computer Testing functionality of software Theories: The student should explain:	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Computer set Digital and analogue multimeters Tool kit Work bench Work bench light Gloves Overcoat/overall Boots 	26

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			for various devices, either manually from a CD or by downloading them from the manufacturer's website. Hands-On Practice: Organise students into manageable groups, provide them with different hardware components, and have them install and test drivers, ensuring that all devices work correctly			<ul style="list-style-type: none"> Meaning of software Types of computer software Uses of software Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions when installing software Safe handling of software, tools and equipments. 		
		(d) Installing application software	Brainstorm: Guide students to discuss the types of application software, installation procedures, and potential	<ul style="list-style-type: none"> Select tools and equipment Install software Test functionality Observe 	Installed computer software functions as per the manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to install computer	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Computer set Digital and analogue multimeters Tool kit 	26

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>challenges during the installation process.</p> <p>Practical Work: Guide students in installing application software from various sources, such as CDs, its role in protecting systems, and common installation methods, online downloads, or app stores, ensuring proper setup and configuration.</p> <p>Hands-On Practice: Organise students into manageable groups, provide them with installation files for different</p>	<p>safety precautions</p> <ul style="list-style-type: none"> Clean tools, equipment and workplace <p>Store tools and equipment.</p>		<p>software</p> <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> Installing software to computer Testing functionality of software <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> Meaning of software Types of computer software Uses of software <p>Circumstantial knowledge:</p> <p>Detailed knowledge about:</p> <ul style="list-style-type: none"> Safety precautions when installing software Safe handling of software, tools and 	<ul style="list-style-type: none"> Work bench Work bench light Gloves Overcoat/overall Boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			applications, and have them install and test the software, ensuring it runs correctly			equipments.		
		(e) Installing anti-virus software	<p>Brainstorm: Facilitate students defining antivirus and to discussing the importance of antivirus software, its role in protecting systems, and common installation methods.</p> <p>Practical Work: Guide students in downloading, installing, and configuring anti-virus software, ensuring it is updated and properly activated.</p> <p>Hands-On</p>	<ul style="list-style-type: none"> • Select tools and equipment • Install software • Test functionality • Observe safety precautions • Clean tools, equipment and workplace <p>Store tools and equipment.</p>	Installed computer software functions as per the manufacturer's specifications.	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to install computer software</p> <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Installing software to computer • Testing functionality of software <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Meaning of software • Types of computer 	<p>The following tools, equipment and safety gear should be available:</p> <ul style="list-style-type: none"> • Computer set • Digital and analogue multimeters • Tool kit • Work bench • Work bench light • Gloves • Overcoat/overall • Boots 	26

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			Practice: Organise students into manageable groups, provide them with anti-virus installation files, and have them install and test the software, ensuring it runs scans and provides protection			software <ul style="list-style-type: none"> • Uses of software Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> • Safety precautions when installing software • Safe handling of software, tools and equipment. 		
2.0 Servicing Data Communication Systems	2.1 Installing Voice, Fax Data Modems	(a) Installing data modems	Brainstorm: Guide students to define data modem and discuss the types of data modems, their functions, and how they connect to computers and networks. Practical Work: Guide students in physically installing a data modem,	<ul style="list-style-type: none"> • Select tools and equipment • Identify communication device • Connect communication devices to computer • Test operation of communication devices • Record test results • Interpret test 	Connected communication device functions as per the manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to connect communication devices to personal computer Principles: The student should explain the principles of: <ul style="list-style-type: none"> • Connecting communication 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Digital and analogue multimeters • Personal computer set • Telephone • Facsimile machine • Modem • Tool kit • Work bench • Gloves • Overcoat/ Overall • Boots 	37

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			configuring the necessary network settings, and ensuring it is ready for data transmission. Hands-On Practice: Organise students into manageable groups, provide them with data modems, and have them install and test modem functionality by connecting to a network or performing data transfers	results <ul style="list-style-type: none"> • Observe safety regulations • Clean tools, equipment and workplace • Store tools and equipment. 		devices to computer <ul style="list-style-type: none"> • Modulation and demodulation of data • Encoding and decoding Theories: The student should explain: <ul style="list-style-type: none"> • Types of communication devices • Functions of Modem • Difference between voice and text data • Functions of CODEC Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> • Safety precautions in installing communication devices in computer systems • Safe handling 		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						of tools, equipment, personal computers and communication devices.		
		(b) Installing telephone equipment	<p>Brainstorm: Lead students into discussion on the types of telephone equipment, their functions, and common installation methods and challenges.</p> <p>Practical Work: Guide students in installing telephone equipment, including connecting phones, wiring, and configuring settings for communication.</p> <p>Hands-On Practice:</p>	<ul style="list-style-type: none"> • Select tools and equipment • Identify communication device • Connect communication devices to computer • Test operation of communication devices • Record test results • Interpret test results • Observe safety regulations • Clean tools, equipment and workplace 	Connected communication device functions as per the manufacturer's specifications.	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to connect communication devices to personal computer</p> <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Connecting communication devices to computer • Modulation and demodulation of data • Encoding and decoding <p>Theories: The</p>	<p>The following tools, equipment and safety gear should be available:</p> <ul style="list-style-type: none"> • Digital and analogue multimeters • Personal computer set • Telephone • Facsimile machine • Modem • Tool kit • Work bench • Gloves • Overcoat/ Overall • Boots 	37

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			Organise students into manageable groups, provide them with telephone equipment, and have them install and test the system to ensure proper operation	Store tools and equipment.		student should explain: <ul style="list-style-type: none"> • Types of communication devices • Functions of Modem • Difference between voice and text data • Functions of CODEC Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> • Safety precautions in installing communication devices in computer systems • Safe handling of tools, equipment, personal computers and communication devices. 		
		(c) Installing fax equipment	Brainstorm: Facilitate	<ul style="list-style-type: none"> • Select tools and 	Connected communication	Knowledge evidence:	The following tools, equipment and safety	37

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>students to discuss the different types of fax equipment, their functions, and the setup process, including connections to phone lines and computers.</p> <p>Practical Work: Guide students in connecting and configuring fax machines, ensuring proper phone line connections, and testing fax functionality.</p> <p>Hands-On Practice: Organise students into manageable groups, provide them with fax machines, and have them install and test the</p>	<p>equipment</p> <ul style="list-style-type: none"> Identify communication device Connect communication devices to computer Test operation of communication devices Record test results Interpret test results Observe safety regulations Clean tools, equipment and workplace <p>Store tools and equipment.</p>	<p>g device functions as per the manufacturer's specifications.</p>	<p>Detailed knowledge of: Method used: The student should explain how to connect communication devices to personal computer</p> <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> Connecting communication devices to computer Modulation and demodulation of data Encoding and decoding <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> Types of communication devices Functions of Modem Difference 	<p>gear should be available:</p> <ul style="list-style-type: none"> Digital and analogue multimeters Personal computer set Telephone Facsimile machine Modem Tool kit Work bench Gloves Overcoat/ Overall Boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			equipment by sending and receiving a fax			between voice and text data <ul style="list-style-type: none"> • Functions of CODEC Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> • Safety precautions in installing communication devices in computer systems • Safe handling of tools, equipment, personal computers and communication devices. 		
	2.2 Troubleshooting Data Communication Equipment	(d) Troubleshooting data modems	Brainstorm: Facilitate a discussion on common issues faced by data modems, such as connection problems, speed issues, and troubleshooting	<ul style="list-style-type: none"> • Select tools and equipment • Connect data communication devices to computers • Test 	Data communication equipment serviced as per the manufacturer's guidelines.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to detect malfunctions in data communication	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Personal computer set. • Data communication devices • Digital and analogue 	36

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>methods.</p> <p>Practical Work: Guide students in diagnosing and troubleshooting data modem issues by checking cables, modem settings, and connection speeds.</p> <p>Hands-On Practice: Organise students into manageable groups, provide them with malfunctioning modems, and have them identify and resolve issues related to connectivity and performance</p>	<p>operation of communication devices</p> <ul style="list-style-type: none"> • Troubleshoot defective communication devices • Identify communication problems • Rectify communication problems • Observe safety regulations • Clean tools, equipment and workplace • Store tools, equipment and components 		<p>devices</p> <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Testing data communication devices • Modulation and demodulation • Encoding and decoding <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Functions of a facsimile machine • Advantages of PC fax over normal fax communication • The difference between wireless and wire-line communication • The difference between analogue and digital data 	<p>multimeters</p> <ul style="list-style-type: none"> • Tool kit • Work bench • Gloves • Overcoat/Overall • Boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions in data communication Safe handling of tools, equipment and communication devices. 		
		(e) Troubleshooting wire line links	Brainstorm: Guide students to discuss common issues with wire-line links, such as signal loss, connectivity problems, and interference, and identify troubleshooting techniques. Practical Work: Guide students in testing wire-line connections using tools like cable testers,	<ul style="list-style-type: none"> Select tools and equipment Connect data communication devices to computers Test operation of communication devices Troubleshoot defective communication devices Identify communication 	Data communication equipment serviced as per the manufacturer's guidelines.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to detect malfunctions in data communication devices Principles: The student should explain the principles of: <ul style="list-style-type: none"> Testing data communication devices Modulation and 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Personal computer set. Data communication devices Digital and analogue multimeters Tool kit Work bench Gloves Overcoat/Overall Boots 	36

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>checking for physical damage, and verifying proper signal strength.</p> <p>Hands-On Practice: Organise students into manageable groups, provide them with faulty wire-line links, and have them diagnose and repair connection issues by testing cables and equipment</p>	<p>ion problems</p> <ul style="list-style-type: none"> • Rectify communication problems • Observe safety regulations • Clean tools, equipment and workplace • Store tools, equipment and components • 		<p>demodulation</p> <ul style="list-style-type: none"> • Encoding and decoding <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Functions of a facsimile machine • Advantages of PC fax over normal fax communication • The difference between wireless and wire-line communication • The difference between analogue and digital data <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> • Safety precautions in data communication • Safe handling of 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	Knowledge Assessment		
						equipment and communication devices.		
		(f) Troubleshooting wireless links	<p>Brainstorm: Guide students to discuss common issues with wireless links, such as weak signals, interference, and connection drops, and explore troubleshooting methods.</p> <p>Practical Work: Guide students in using tools like signal strength meters, checking configurations, and troubleshooting wireless settings to resolve connection issues.</p> <p>Hands-On Practice: Organise students into manageable</p>	<ul style="list-style-type: none"> • Select tools and equipment • Connect data communication devices to computers • Test operation of communication devices • Troubleshoot defective communication devices • Identify communication problems • Rectify communication problems • Observe safety regulations • Clean tools, 	Data communication equipment serviced as per the manufacturer's guidelines.	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to detect malfunctions in data communication devices</p> <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Testing data communication devices • Modulation and demodulation • Encoding and decoding <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Functions of a facsimile machine • Advantages of 	<p>The following tools, equipment and safety gear should be available:</p> <ul style="list-style-type: none"> • Personal computer set. • Data communication devices • Digital and analogue multimeters • Tool kit • Work bench • Gloves • Overcoat/Overall • Boots 	37

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			groups, provide them with wireless devices, and have them troubleshoot and resolve issues related to connectivity, signal strength, and interference	equipment and workplace <ul style="list-style-type: none"> • Store tools, equipment and components • 		PC fax over normal fax communication <ul style="list-style-type: none"> • The difference between wireless and wire-line communication • The difference between analogue and digital data Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> • Safety precautions in data communication • Safe handling of tools, equipment and communication devices. 		
		(g) Troubleshooting optic fibre links	Brainstorm: Lead students to define fiber optic and discuss the principles of optical fiber communication,	<ul style="list-style-type: none"> • Select tools and equipment • Connect data communication devices 	Data communication equipment serviced as per the manufacturer's guidelines.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Personal computer set. • Data communication 	37

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>common issues with fiber optic links, and methods for diagnosing problems like signal loss or fiber breakage.</p> <p>Practical Work: Guide students in using tools such as optical power meters, visual fault locators, and fiber splicing kits to troubleshoot fiber optic links.</p> <p>Hands-On Practice: Organise students into manageable groups, provide them with fiber optic cables and tools, and have them diagnose and resolve issues like poor signal strength or</p>	<p>to computers</p> <ul style="list-style-type: none"> • Test operation of communication devices • Troubleshoot defective communication devices • Identify communication problems • Rectify communication problems • Observe safety regulations • Clean tools, equipment and workplace • Store tools, equipment and components • 		<p>detect malfunctions in data communication devices</p> <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Testing data communication devices • Modulation and demodulation • Encoding and decoding <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Functions of a facsimile machine • Advantages of PC fax over normal fax communication • The difference between wireless and wire-line communication • The difference between 	<p>devices</p> <ul style="list-style-type: none"> • Digital and analogue multimeters • Tool kit • Work bench • Gloves • Overcoat/Overall • Boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			physical damage to the cables			analogue and digital data Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions in data communication Safe handling of tools, equipment and communication devices. 		
		(h) Troubleshooting satellite links	Brainstorm: Guide students into defining satellite links and discuss the principles of optical fiber communication, common issues with fiber optic links, and methods for diagnosing problems like signal loss or fiber breakage.	<ul style="list-style-type: none"> Select tools and equipment Connect data communication devices to computers Test operation of communication devices Troubleshoot defective communication devices 	Data communication equipment serviced as per the manufacturer's guidelines.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to detect malfunctions in data communication devices Principles: The student should explain the principles of: <ul style="list-style-type: none"> Testing data communication 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Personal computer set. Data communication devices Digital and analogue multimeters Tool kit Work bench Gloves Overcoat/Overall Boots 	37

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>Practical Work: Guide students in using tools such as optical power meters, visual fault locators, and fiber splicing kits to troubleshoot fiber optic links.</p> <p>Hands-On Practice: Organise students into manageable groups, provide them with fiber optic cables and tools, and have them diagnose and resolve issues like poor signal strength or physical damage to the cables</p>	<ul style="list-style-type: none"> Identify communication problems Rectify communication problems Observe safety regulations Clean tools, equipment and workplace Store tools, equipment and components 		<p>devices</p> <ul style="list-style-type: none"> Modulation and demodulation Encoding and decoding <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> Functions of a facsimile machine Advantages of PC fax over normal fax communication The difference between wireless and wire-line communication The difference between analogue and digital data <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> Safety precautions in data communication 		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						<ul style="list-style-type: none"> Safe handling of tools, equipment and communication devices. 		
3.0 Servicing Power Backup Equipment	3.1 Installing Uninterruptible Power Supply Ups	(a) Installing UPS	<p>Brainstorm: Guide students to discuss the purpose of an uninterruptible power supply (UPS), its components, and the steps involved in the installation process.</p> <p>Practical Work: Guide students in connecting a UPS to a computer system, configuring settings, and verifying proper functionality through load testing.</p> <p>Hands-On Practice:</p>	<ul style="list-style-type: none"> Select tools and components Install UPS faults Test UPS Observe safety regulations Clean tools, equipment and workplace Store tools, equipment and components 	Installed UPS functions as per the manufacturer's specifications.	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to Install an uninterruptible power supply (UPS)</p> <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> Installing UPS Testing input/output (supplies) voltages <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> Major parts of UPS Types of UPS Function of 	<p>The following tools, equipment and safety gear should be available:</p> <ul style="list-style-type: none"> Uninterruptible power supply (UPS) Digital and analogue multimeters Tool kit Work bench Work bench light Gloves Overcoat / Overall Boots 	14

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			Organise students into manageable groups, provide them with UPS units, and have them install and test the UPS with various devices to ensure proper power backup and functionality			UPS <ul style="list-style-type: none"> Advantages and disadvantages of UPS Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions when installing UPS Safe handling of tools, equipment and components. 		
		(b) Troubleshooting UPS faults	Brainstorm: Guide students to discuss common UPS faults, such as battery failure, power surges, and overload issues, and identify troubleshooting strategies. Practical Work: Guide students in diagnosing UPS	<ul style="list-style-type: none"> Select tools and components Troubleshoot UPS faults Clear UPS faults Test UPS Interpret test results Observe safety regulations Clean tools, equipment 	Installed UPS functions as per the manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: <ul style="list-style-type: none"> Troubleshoot UPS Principles: The student should explain the principles of: <ul style="list-style-type: none"> Troubleshooting UPS 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Uninterruptible power supply (UPS) Digital and analogue multimeters Tool kit Work bench Work bench light Gloves Overcoat / Overall Boots 	15

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			faults by checking battery health, testing power output, and reviewing error codes or indicators. Hands-On Practice: Organise students into manageable groups, provide them with faulty UPS units, and have them troubleshoot and resolve issues, such as replacing batteries or recalibrating settings	and workplace <ul style="list-style-type: none"> • Store tools, equipment and components 		<ul style="list-style-type: none"> • Testing input/output (supplies) voltages Theories: The student should explain: <ul style="list-style-type: none"> • Major parts of UPS • Types of UPS • Function of UPS • Advantages and disadvantages of UPS Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> • Safety precautions when installing UPS • Safe handling of tools, equipment and components. 		
	3.2 Installing Solar Cell Modules	(c) Installing solar panels	Brainstorm: Guide students to discuss the components of a	The students should be able to: <ul style="list-style-type: none"> • Interpret 	Installed solar cell modules function as per the	Knowledge evidence: Detailed knowledge of:	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Digital and 	14

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>solar power system, the installation process, and safety considerations when installing solar panels.</p> <p>Practical Work: Guide students through the process of mounting solar panels, connecting them to inverters, and configuring the system for optimal energy generation.</p> <p>Hands-On Practice: Organise students into manageable groups, provide them with solar panels and necessary equipment, and have them install</p>	<p>circuit diagrams</p> <ul style="list-style-type: none"> Select tools and equipment Select cells and solar panel Connect solar panels to solar cells Measure output voltages of cells Record measurement results Observe safety precautions Clean tools, equipment and workplace Store tools, equipment and components 	manufacturer's specifications.	<p>Method used: The students should explain how to:</p> <ul style="list-style-type: none"> Install solar panels Connect solar cell modules <p>Principles: The students should explain the principles of:</p> <ul style="list-style-type: none"> Installing solar panels Maintaining solar panels <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> Characteristics of solar cells Parameters of solar panels Parts of solar power circuits and their functions <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> Safety precautions 	<p>analogue multimeters</p> <ul style="list-style-type: none"> Solar cells Solar panels Tool kit Work bench Gloves Overcoat / Overall Boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			and test the system by measuring energy output			when installing solar power <ul style="list-style-type: none"> • Safe handling of tools, equipment and solar panels. 		
		(d) Panning solar panels for optimum performance	Brainstorm: Facilitate students to discuss the factors affecting the performance of solar panels, including angle, orientation, and environmental conditions, and how to optimize them for maximum efficiency. Practical Work: Guide students in adjusting the angle and direction of solar panels, using tools like an inclinometer and compass, to achieve optimal	The student should be able to: <ul style="list-style-type: none"> • Interpret circuit diagrams • Select tools and equipment • Pan solar panel • Observe safety precautions • Clean tools, equipment and workplace • Store tools, equipment and components 	Installed solar cell modules function as per the manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: <ul style="list-style-type: none"> • pan solar panels Principles: The student should explain the principles of: <ul style="list-style-type: none"> • pan solar panels • Maintaining solar panels Theories: The student should explain: <ul style="list-style-type: none"> • Characteristics of solar cells • Parameters of solar panels • Parts of solar power circuits 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Digital and analogue multimeters • Solar cells • Solar panels • Tool kit • Work bench • Gloves • Overcoat / Overall • Boots 	14

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			sun exposure throughout the day. Hands-On Practice: Organise students into manageable groups, provide them with solar panels, and have them pan and test the panels for optimal performance by measuring energy output at different angles and times of day			and their functions Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions when installing solar power Safe handling of tools, equipment and solar panels. 		
		(e) Connecting solar panel with batteries	Brainstorm: Lead students into discussion on the process of connecting solar panels to batteries, including the importance of charge controllers and the role of the battery in storing	The student should be able to: <ul style="list-style-type: none"> Interpret circuit diagrams Select tools and equipment Select cells Connect solar panels to solar cells 	Installed solar cell modules function as per the manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: <ul style="list-style-type: none"> Install solar panels Connect solar cell modules Principles: The student should	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Digital and analogue multimeters Solar cells Solar panels Tool kit Work bench Gloves Overcoat / Overall Boots 	14

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>solar energy.</p> <p>Practical Work: Guide students in wiring solar panels to batteries through a charge controller, ensuring correct polarity and safety precautions during the connection process.</p> <p>Hands-On Practice: Organise students into manageable groups, provide them with solar panels, batteries, and charge controllers, and have them complete the connection and test the system to ensure proper charging</p>	<ul style="list-style-type: none"> • Measure output voltages of cells • Record measurement results • Observe safety precautions • Clean tools, equipment and workplace • Store tools, equipment and components 		<p>explain the principles of:</p> <ul style="list-style-type: none"> • Connecting solar batteries • Maintaining solar panels <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Characteristics of solar cells • Parameters of solar panels • Parts of solar power circuits and their functions <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> • Safety precautions when installing solar power • Safe handling of tools, equipment and solar panels. 		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
		(f) Connecting batteries to inverter circuit	<p>Brainstorm: Guide students to discuss the role of inverters in converting DC to AC power, and explain the importance of safely connecting batteries to the inverter circuit for effective power conversion.</p> <p>Practical Work: Guide students in wiring the batteries to the inverter, ensuring correct polarity, and checking voltage levels to ensure compatibility and safe operation.</p> <p>Hands-On Practice: Organise students into manageable groups, provide</p>	<p>The student should be able to:</p> <ul style="list-style-type: none"> • Interpret circuit diagrams • Select tools and equipment • Connect batteries to an inverter • Measure output voltages of cells and inverter • Record measurement results • Observe safety precautions • Clean tools, equipment and workplace • Store tools, equipment and components 	Installed solar cell modules function as per the manufacturer's specifications.	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to:</p> <ul style="list-style-type: none"> • Install solar panels • Connect solar cell modules <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Connecting solar batteries • Maintaining solar panels <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Characteristics of solar cells • Parameters of solar panels • Parts of solar power circuits and their functions <p>Circumstantial</p>	<p>The following tools, equipment and safety gear should be available:</p> <ul style="list-style-type: none"> • Digital and analogue multimeters • Solar cells • Solar panels • Tool kit • Work bench • Gloves • Overcoat / Overall • Boots 	15

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			them with batteries and inverters, and have them connect the batteries to the inverter circuit, then test the output to ensure it is functioning correctly			knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions when installing solar power Safe handling of tools, equipment and solar panels. 		
		(g) Installing control units	Brainstorm: Discuss the function of control units in various systems, including their role in managing operations and ensuring system efficiency, and identify common installation practices. Practical Work: Guide students through the installation of control units, ensuring proper connections,	The student should be able to: <ul style="list-style-type: none"> Interpret circuit diagrams Select tools and equipment Install control unit Observe safety precautions Clean tools, equipment and workplace Store tools, equipment and 	Installed solar cell modules function as per the manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: <ul style="list-style-type: none"> Install control unit Principles: The student should explain the principles of: <ul style="list-style-type: none"> Installing control unit Theories: The student should explain: <ul style="list-style-type: none"> Characteristics of solar cells Parameters of 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Digital and analogue multimeters Solar cells Solar panels Tool kit Work bench Gloves Overcoat / Overall Boots 	15

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			settings configuration, and integration with other system components. Hands-On Practice: Organise students into manageable groups, provide them with control units and related components, and have them install and configure the units to control system operations effectively	components		solar panels <ul style="list-style-type: none"> Parts of solar power circuits and their functions Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions when installing solar power Safe handling of tools, equipment and solar panels. 		
	3.3 Servicing Storage Batteries	(a) Charging batteries using solar power	Brainstorm: Facilitate students to discuss the process of charging batteries using solar power, including the role of charge controllers, battery types, and the importance of	<ul style="list-style-type: none"> Interpret manufacturer's manual Select tools and equipment Service storage batteries Test storage batteries Observe 	Serviced storage batteries function conforming to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to service storage batteries Principles: The student should explain the	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Storage battery Digital and analogue multimeters Tool kit Work bench Work bench light Magnifying glass Gloves 	12

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>proper sunlight exposure.</p> <p>Practical Work: Guide students in setting up a solar-powered charging system, connecting the solar panels to the charge controller and batteries, and ensuring correct voltage and current for efficient charging.</p> <p>Hands-On Practice: Organise students into manageable groups, provide them with solar panels, charge controllers, and batteries, and have them charge the batteries while monitoring the process for</p>	<p>safety precautions</p> <ul style="list-style-type: none"> • Clean tools, equipment and workplace • Store tools and equipment 		<p>principles of:</p> <ul style="list-style-type: none"> • Servicing storage batteries • Using measuring instruments <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Types of storage batteries • Difference between primary and secondary batteries • Functions of storage batteries • Parts of storage batteries <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> • Safety precautions during servicing 	<ul style="list-style-type: none"> • Overcoat / Overall • Boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			optimal performance			storage batteries • Safe handling of tools and equipment		
		(b) Testing batteries	<p>Brainstorm: Guide students to discuss different methods of testing battery health, including checking voltage, capacity, and internal resistance, and how these affect performance.</p> <p>Practical Work: Guide students in testing batteries using a multimeter to measure voltage and conducting a load test to assess battery capacity and overall health.</p> <p>Activity: Organise students</p>	<ul style="list-style-type: none"> • Interpret manufacturer's manual • Select tools and equipment • Test storage batteries • Observe safety precautions • Clean tools, equipment and workplace • Store tools and equipment 	Serviced storage batteries function conforming to manufacturer's specifications.	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to service storage batteries Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Using measuring instruments <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Types of storage batteries • Difference between primary and secondary batteries 	<p>The following tools, equipment and safety gear should be available:</p> <ul style="list-style-type: none"> • Storage battery • Digital and analogue multimeters • Tool kit • Work bench • Work bench light • Magnifying glass • Gloves • Overcoat / Overall • Boots 	12

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			into manageable groups, provide them with batteries, and have them perform voltage and load tests to determine battery health and functionality			<ul style="list-style-type: none"> Functions of storage batteries Parts of storage batteries Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions during servicing storage batteries Safe handling of tools and equipment. 		
4.0 Managing Workshop Activities	4.1 Designing Workshop Layout	(a) Outlining workshop service bay	Brainstorm: Facilitate students to define workshop service bay and discuss key components of a workshop service bay and the importance of proper layout and safety. Demonstration of a Properly	<ul style="list-style-type: none"> The student should be able to: Plan workshop layout Locate workshop sections Locate the installation of different machines Identify 	Designed workshop layout conforms to environmental and Ministry of Labour rules and regulations.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: <ul style="list-style-type: none"> Arrange different workshop sections Apply safety precautions Principles: The	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Organization structures Different workshop layouts Overhead projector Computer Chalk board Workshop with various sections Different management text 	7

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>Designed Workshop Layout: Show students an example of an effective workshop layout, if possible, give students a real-life or virtual tour of an actual workshop layout.</p> <p>Group Discussions and Problem Solving: Organise students into manageable groups and give them a scenario where they have to redesign a poorly arranged workshop. Provide them with a list of issues (e.g., cluttered workspace, lack of safety equipment</p>	<p>places for safety gear equipment</p> <ul style="list-style-type: none"> Identify convenient place for stores Identify convenient place to assemble in case of emergency Mark emergency exit Locate information resource centre Locate laundry and latrines Arrange tools Design security system of tools and equipment Implement safety 		<p>student should explain the principles of:</p> <ul style="list-style-type: none"> Laying out workshop <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> Steps to design workshop layout Components applied in workshop safety and security systems <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> Safe handling of working tools and equipment Environmental impacts. 	<p>books</p> <ul style="list-style-type: none"> Handouts Drawing instruments Computer Virtual reality devices 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			access, poor ventilation, etc.). Have each group present their proposed layout changes, explaining how their design solves the issues.	system to workers <ul style="list-style-type: none"> Identify marks and postures Place sign mark and postures Label safety precautions for workshop materials and goods. 				
		(b) Designing layout of light duty equipment	Brainstorm: Discuss the factors influencing the design of light-duty equipment layouts, such as equipment size, workflow, and safety requirements. Space Planning Work: Guide students in designing a layout for light-duty equipment,	<ul style="list-style-type: none"> The student should be able to: Plan workshop layout Locate workshop sections Locate the installation of different machines Identify places for safety gear equipment Identify 	Designed workshop layout conforms to environmental and Ministry of Labour rules and regulations.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: <ul style="list-style-type: none"> Arrange different workshop sections Apply safety precautions Principles: The student should explain the principles of: <ul style="list-style-type: none"> Laying out 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Organization structures Different workshop layouts Overhead projector Computer Chalk board Workshop with various sections Different management text books Handouts Drawing 	7

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>ensuring efficient space utilization, accessibility, and safe operations.</p> <p>Design Challenge: Organise students into manageable groups, provide a scenario where they are tasked with creating a layout for a small electronic workshop using only light-duty equipment.</p> <p>Presentation: Each group presents their layout design, explaining why they positioned equipment in specific ways and how they ensured safety and workflow.</p>	<p>convenient place for stores</p> <ul style="list-style-type: none"> Identify convenient place to assemble in case of emergency Mark emergency exit Locate information resource centre Locate laundry and latrines Arrange tools Design security system of tools and equipment Implement safety system to workers Identify marks and 		<p>workshop</p> <ul style="list-style-type: none"> Machine installation in workshop <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> Steps to design workshop layout Components applied in workshop safety and security systems <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> Safe handling of working tools and equipment Environmental impacts. 	instruments	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
				postures <ul style="list-style-type: none"> Place sign mark and postures Label safety precautions for workshop materials and goods. 				
		(c) Designing layout of heavy-duty equipment	Brainstorm: Guide students to discuss the considerations for designing layouts of heavy-duty equipment, including space requirements, equipment weight, power supply, and safety protocols. Space Planning: Guide students to plan the layout for heavy-duty equipment, focusing on optimizing space for machinery,	<ul style="list-style-type: none"> The student should be able to: Plan workshop layout Locate workshop sections Locate the installation of different machines Identify places for safety gear equipment Identify convenient place for stores Identify 	Designed workshop layout conforms to environmental and Ministry of Labour rules and regulations.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: <ul style="list-style-type: none"> Arrange different workshop sections Apply safety precautions Principles: The student should explain the principles of: <ul style="list-style-type: none"> Laying out workshop Machine installation in workshop 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Organization structures Different workshop layouts Overhead projector Computer Chalk board Workshop with various sections Different management text books Handouts Drawing instruments 	7

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>ensuring safety clearances, and accommodating heavy loads.</p> <p>Demonstration of a Real Workshop Layout: Take students on a field trip to a workshop or show them a video of a real workshop layout designed for heavy-duty equipment.</p> <p>Group Activity: Organise students into manageable groups, provide them with specifications for heavy-duty equipment, and have them create and present layout designs that prioritize safety,</p>	<p>convenient place to assemble in case of emergency</p> <ul style="list-style-type: none"> • Mark emergency exit • Locate information resource centre • Locate laundry and latrines • Arrange tools • Design security system of tools and equipment • Implement safety system to workers • Identify marks and postures • Place sign mark and postures 		<p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Steps to design workshop layout • Components applied in workshop safety and security systems <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> • Safe handling of working tools and equipment • Environmental impacts. 		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			accessibility, and functionality	<ul style="list-style-type: none"> Label safety precautions for workshop materials and goods. 				
	4.2 Controlling Tools and Equipment	(d) Maintaining tools control system	<p>Brainstorm: Guide the students to discuss the importance of a tools control system, including inventory management, tracking usage, and ensuring tool maintenance and safety.</p> <p>Hands-on Exercise: Organise students into manageable groups, provide them with tools and a tracking system, and have them organise a designated area of the workshop where tools are</p>	<ul style="list-style-type: none"> Design tools storage system Keep record of tools and equipment in workshop Record tools and equipment issued and received daily Record damaged tools and equipment Record lost equipment and tools Discard damaged tools and equipment Order new 	Tools and equipment controlled as per stores and financial regulations.	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to:</p> <ul style="list-style-type: none"> Maintain ledgers of tools and equipment Conduct stock taking Maintain Tools inventory records of tools and equipment <p>Principles: The student should explain the principles of controlling tools and equipment in workshops</p> <p>Theories: The student should explain:</p>	<p>The following tools, equipment and safety gear should be available:</p> <ul style="list-style-type: none"> Skills logbook Tools and equipment catalogue Scientific calculator Staple machine Binding machine Tools list Wall cupboards Bench with tool crip Tool kit. Tools issue voucher Tools ledger Files Equipment ledger Tools inventory list Overcoat Safety boots 	J9

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			stored. Research: Have students find and test digital tools and software that can be used to track tools in the workshop.	tools and equipment • Produce report of tools and equipment		<ul style="list-style-type: none"> • Properties of tools and equipment • Effects of weather on different tools • Required security in stores/workshops Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> • Safety precautions while controlling tools and equipment • Safe handling of tools and equipment • Waste disposal. 		
		(e) Taking inventory of tools and equipment	Brainstorm: Guide students to discuss the importance of taking inventory, including methods for tracking tools and	<ul style="list-style-type: none"> • Design tools storage system • Keep record of tools and equipment in workshop • Record tools 	Tools and equipment controlled as per stores and financial regulations.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: <ul style="list-style-type: none"> • Maintain 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Skills logbook • Tools and equipment catalogue • Scientific calculator 	9

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>equipment, and how inventory management contributes to efficiency and cost control.</p> <p>Interactive Tool Inventory Exercise: Engage students in an exercise where they create an inventory list for workshop tools</p> <p>Hands-On Activity: Organise students into manageable groups, have them physically walk around the workshop and record the tools and equipment they see in an inventory notebook or spreadsheet.</p>	<p>and equipment issued and received daily</p> <ul style="list-style-type: none"> Record damaged tools and equipment Record lost equipment and tools Discard damaged tools and equipment Order new tools and equipment Produce report of tools and equipment 		<p>ledgers of tools and equipment</p> <ul style="list-style-type: none"> Conduct stock taking Maintain Tools inventory records of tools and equipment <p>Principles: The student should explain the principles of controlling tools and equipment in workshops</p> <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> Properties of tools and equipment Effects of weather on different tools Required security in stores/workshops <p>Circumstantial knowledge: Detailed knowledge about:</p>	<ul style="list-style-type: none"> Staple machine Binding machine Tools list Wall cupboards Bench with tool crib Tool kit. Tools issue voucher Tools ledger Files Equipment ledger Tools inventory list Overcoat Safety boots 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						<ul style="list-style-type: none"> Safety precautions while controlling tools and equipment Safe handling of tools and equipment Waste disposal. 		
	4.3 Estimating Materials and Labour Cost	(a) Maintaining records of workshop materials	<p>Brainstorm: Guide students to discuss the significance of maintaining accurate records for workshop materials, including tracking stock levels, usage, and reorder points.</p> <p>Practical Work: Guide students in setting up a record-keeping system for workshop materials, using either manual logs or digital</p>	<ul style="list-style-type: none"> Select tools and equipment Read inspection report Store tools, equipment and materials 	Cost estimates of materials and labour prepared as per task requirements.	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to:</p> <ul style="list-style-type: none"> Maintain record of workshop materials <p>Principles: The student should explain the principles of maintaining a record of workshop materials</p> <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> maintaining a 	<p>The following tools, equipment and safety gear should be available:</p> <ul style="list-style-type: none"> List of spares and material Prepared materials Local purchases order (LPO) Calculator/Computer Binding machine Material requisition form (Material requisition voucher form (MVR)) Job card Price list Mask Goods receive note (GRN) Gloves 	6

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			tools for tracking inventory. Hands-On Activity: Organise students into manageable groups, provide them with sample workshop materials, and ask them to enter the relevant details into a physical logbook and/or create a spreadsheet or use an inventory management tool to record materials used in a sample project.			record of workshop materials Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safe handling of materials and documents Waste disposal. 	<ul style="list-style-type: none"> Overcoat Safety boot 	
		(b) Maintaining man hours/day workshop staff	Brainstorm: Guide students to discuss the importance of tracking man-hours for workshop staff, including its role	<ul style="list-style-type: none"> Select tools and equipment Prepare job cost Record man hour/day workshop 	Cost estimates of materials and labour prepared as per task requirements.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: <ul style="list-style-type: none"> Maintain man 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> List of spares and material Prepared materials Local purchases order (LPO) 	6

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>in productivity, scheduling, and cost management.</p> <p>Research: Guide students to identify and test different digital time tracking tools.</p> <p>Practical Work: Guide students in setting up a system to record and track daily man-hours worked by staff, ensuring accurate timekeeping and reporting.</p> <p>Hands-On Activity: Organise students into manageable groups, assign them staff roles (e.g., worker, supervisor) in a</p>	staff.		<p>hours/day workshop staff</p> <p>Principles: The student should explain the principles of determining manhour rate to make labour cost estimates</p> <p>Theories: The student should explain: Maintain man hours/day workshop staff</p> <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> • Safe handling of materials and documents • Waste disposal. 	<ul style="list-style-type: none"> • Calculator/Computer • Binding machine • Material requisition form (Material requisition voucher form (MVR)) • Job card • Price list • Mask • Goods receive note (GRN) • Gloves • Overcoat • Safety boot 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			simulated project, and have track their hours and report back with the total man hours worked during the project.					
		(c) Performing job cost calculations	<p>Brainstorm: Guide students to discuss the key factors involved in job cost calculations, including labour, materials, overhead, and time, and how to use these factors to determine the total cost of a project.</p> <p>Cost Calculations: Guide students in calculating direct and indirect job costs by factoring in labour rates, material costs, and overhead</p>	<ul style="list-style-type: none"> Select tools and equipment Prepare job cost and materials 	Cost estimates of materials and labour prepared as per task requirements.	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to:</p> <ul style="list-style-type: none"> Calculate costs of materials and labour <p>Principles: The student should explain the principles of determining manhour rate to make labour cost estimates Theories: The student should explain:</p> <ul style="list-style-type: none"> Importance of estimating materials and 	<p>The following tools, equipment and safety gear should be available:</p> <ul style="list-style-type: none"> List of spares and material Prepared materials Local purchases order (LPO) Calculator/Computer Binding machine Material requisition form (Material requisition voucher form (MVR)) Job card Price list Mask Goods receive note (GRN) Gloves Overcoat Safety boot 	6

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			expenses, using real or simulated data. Hands-On Activity: Organise students into manageable groups, provide them with a set of project details, and have them calculate the job cost, ensuring all relevant factors are included in the calculations			labour cost <ul style="list-style-type: none"> Importance of using genuine materials Use of parts catalogue Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safe handling of materials and documents Waste disposal. 		
	4.4 Trainning Subordinates	(a) Preparing training needs	Brainstorm: Guide students to discuss the process of identifying training needs, including assessing skill gaps, evaluating performance, and determining the necessary training resources and objectives.	<ul style="list-style-type: none"> Prepare capability chart of the subordinates Conduct training needs assessment Identify knowledge and skills to be imparted Identify previous knowledge 	<ul style="list-style-type: none"> A training programme prepared to meet job requirements A person trained is able to execute tasks to required standards according 	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to prepare training programme Principles: The student should explain the principles of: <ul style="list-style-type: none"> Carrying out training 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Workshop Tool box Tools Multimeter Workshop machines i.e. <ul style="list-style-type: none"> Grinding machine Drilling machine Valve grinder Drum and disc 	8

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>Designing a Training Programme: Guide students in creating a training needs assessment, identifying specific skills required for different roles, and developing a training programme to address those needs.</p> <p>Role-Playing Exercises: Organise students into manageable groups, assign them roles as supervisors, trainers, or trainees. Have them go through the process of identifying training needs, creating a training plan, and</p>	<p>and skills possessed by the person to be trained</p> <ul style="list-style-type: none"> • Prepare a training programme for the subordinate • Clean the work area • Store tools, equipment, safety gear and other items 	to regulations.	<p>programme by using the four steps plan (prepare, present, try-out assign work)</p> <ul style="list-style-type: none"> • Basic principles of educational psychology <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Necessity of identifying previous knowledge and skill of the person to be trained • The importance of step by step guidance from simple to complex tasks <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> • Safety precautions while training 	<p>service machine</p> <ul style="list-style-type: none"> - Wheel balancing machine - Wheel alignment machine/gauge - Head light aiming machine - Test benches - Bench vices - Anvil - Hydraulic press <ul style="list-style-type: none"> • Surface block • First aid kit • Firefighting equipment • Emergency exit • Overhead projector • Computer • TV • Organization structure • Overcoat • Safety boots • Gloves • Safety clear glasses 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			delivering a short training session on a specific workshop task.			subordinates <ul style="list-style-type: none"> • Safe handling of tools and equipment • Waste disposal. 		
		(b) Carrying out training of subordinates	Brainstorm: Facilitate students to discuss effective training methods, including hands-on demonstrations, group activities, and assessment techniques to ensure successful learning outcomes for subordinates. Preparing Training Programmes: Guide students in preparing and delivering a training session, focusing on clear communication, engaging teaching	<ul style="list-style-type: none"> • Carry out the training programme 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 gear and other 	<ul style="list-style-type: none"> • A training programme prepared to meet job requirements • A person trained is able to execute tasks to required standards according to regulations. 	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to prepare training programme Principles: The student should explain the principles of: <ul style="list-style-type: none"> • Carrying out training programme by using the four steps plan (prepare, present, try-out assign work) • Basic principles of educational psychology Theories: The student should	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Workshop • Tool box • Tools • Multimeter • Workshop machines i.e. <ul style="list-style-type: none"> - Grinding machine - Drilling machine - Valve grinder - Drum and disc service machine - Wheel balancing machine - Wheel alignment machine/gauge - Head light aiming machine 	9

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>techniques, and evaluating progress.</p> <p>Visual and Practical Aids: Guide the students to use visual aids (diagrams, charts, videos) and practical demonstrations to enhance learning.</p> <p>Role-Playing and Simulation Exercises: Organise students into manageable groups, set up a scenario where students must train a peer on a particular task, and have them design and conduct a training session for their peers, followed by feedback and evaluation</p>	items		<p>explain:</p> <ul style="list-style-type: none"> • Necessity of identifying previous knowledge and skill of the person to be trained • The importance of step-by-step guidance from simple to complex tasks <p>Circumstantial knowledge:</p> <p>Detailed knowledge about:</p> <ul style="list-style-type: none"> • Safety precautions while training subordinates • Safe handling of tools and equipment • Waste disposal. 	<ul style="list-style-type: none"> - Test benches - Bench vices - Anvil - Hydraulic press • Surface block • First aid kit • Firefighting equipment • Emergency exit • Overhead projector • Computer • TV • Organization structure • Overcoat • Safety boots • Gloves • Safety clear glasses 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
	4.5 Preparing Reports	(c) Collecting information	<p>Brainstorm: Guide students to discuss the different methods of collecting information, such as surveys, interviews, observation, and research, and how to select the most appropriate method based on the objectives.</p> <p>Practical Work: Guide students in conducting information collection, including formulating questions, gathering data, and organizing the information for analysis.</p> <p>Group Activity: Organise students into manageable groups, provide them with a</p>	<ul style="list-style-type: none"> • Collect information • Write technical reports • Prepare action plan • Prepare budget report • Keep records 	Prepared reports contain required contents as per management requirements.	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to:</p> <ul style="list-style-type: none"> • Prepare technical reports • Keep records <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Supervision • Reporting <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Importance of reports • Contents of reports • Writing of technical report <p>Circumstantial knowledge: Detailed knowledge about:</p> <ul style="list-style-type: none"> • Safe handling 	<p>The following tools, equipment and safety gear should be available:</p> <ul style="list-style-type: none"> • Office/table and chairs • Computer • Subordinates reports • Binding machine • Photocopy machine • Overcoat • Safety boots 	8

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			topic, and have them collect relevant information using different methods, then present their findings to the class			of tools and equipment <ul style="list-style-type: none"> Waste disposal. 		
		(d) Submitting technical reports	<p>Brainstorm: Guide students to discuss the structure and key components of a technical report, including the introduction, methodology, findings, conclusions, and recommendations, and how to present technical information clearly.</p> <p>Practical Work: Guide students in writing a technical report based on data</p>	<ul style="list-style-type: none"> Write technical reports Prepare action plan Prepare budget report Keep records. 	Prepared reports contain required contents as per management requirements.	<p>Knowledge evidence:</p> <p>Detailed knowledge of:</p> <p>Method used: The student should explain how to:</p> <ul style="list-style-type: none"> Prepare technical reports Keep records <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> Supervision Reporting <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> Importance of reports 	<p>The following tools, equipment and safety gear should be available:</p> <ul style="list-style-type: none"> Office/table and chairs Computer Subordinates reports Binding machine Photocopy machine Overcoat Safety boots 	8

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			collected or a given case study, emphasizing accuracy, clarity, and proper formatting. Activity: Organise students into manageable groups, provide them with a project or case study, and have them draft and submit a technical report, ensuring they follow proper report-writing guidelines			<ul style="list-style-type: none"> Contents of reports Writing of technical report Circumstantial knowledge: Detailed knowledge about: <ul style="list-style-type: none"> Safe handling of tools and equipment Waste disposal. 		
	4.6 Managing Workshop Business	(a) Performing entrepreneur tactics	Brainstorm: Guide students to discuss key entrepreneurial tactics, such as identifying opportunities, assessing risks, and developing	<ul style="list-style-type: none"> Calculate total project cost Prepare project write up Select appropriate site for 	Managed workshop business conforms to stipulated regulations.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: <ul style="list-style-type: none"> Establish workshop 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Workshop layout chart Business films/video cassettes Business magazines 	6

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>business strategies to launch and sustain a successful business.</p> <p>Demonstration: Demonstrate to students how to develop a business plan, including identifying target markets, creating a value proposition, and outlining financial strategies for success.</p> <p>Marketing and Sales Strategies: Teach students effective marketing tactics for promoting a business and attracting customers.</p>	<p>establishing workshop</p> <ul style="list-style-type: none"> Acquire land/building for setting up a workshop Purchase tools and equipment 		<p>business</p> <ul style="list-style-type: none"> Run workshop business Analyse profit and loss <p>Principles: The student should explain principles of:</p> <ul style="list-style-type: none"> Acquiring capital from financial institutions Calculating business profit and loss Managing private business workshop Managing non private business workshop <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> Meaning of “business” Meaning of workshop Project write up 	<ul style="list-style-type: none"> Workshop business regulations Scheduled maintenance of machines Job card sheets Safety gear Workshop tools and equipment Personal computer Workshop stores Workshop office Tool ledger book 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			Group Activity: Organise students into manageable groups, provide them with a business scenario, and have them use entrepreneurial tactics to create and present a business plan, including marketing and financial projections			procedures <ul style="list-style-type: none"> • Good customer care Circumstantial knowledge: Detailed knowledge about Safe handling of business capital.		
		(b) Conducting manpower planning	Brainstorm: Guide students to discuss the importance of manpower planning, including analyzing staffing needs, forecasting future workforce requirements, and aligning skills with organizational	<ul style="list-style-type: none"> • Calculate total project cost • Prepare project write up • Perform manpower planning. 	Managed workshop business conforms to stipulated regulations.	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: <ul style="list-style-type: none"> • Conduct manpower planning Principles: The student should explain principles of: <ul style="list-style-type: none"> • Acquiring 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Workshop layout chart • Business films/video cassettes • Business magazines • Workshop business regulations • Scheduled maintenance of machines • Job card sheets 	6

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>goals.</p> <p>Practical Work: Guide students in creating a manpower plan, including determining the number of staff required, identifying skill gaps, and planning for recruitment, training, and retention.</p> <p>Activity: Organise students into manageable groups, provide them with an organizational scenario, and have them conduct manpower planning by assessing staffing needs and preparing a recruitment and</p>			<p>capital from financial institutions</p> <ul style="list-style-type: none"> • Calculating business profit and loss • Managing private business workshop • Managing non private business workshop <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Meaning of “business” • Meaning of workshop • Project write up procedures • Good customer care <p>Circumstantial knowledge: Detailed knowledge about Safe handling of business capital.</p>	<ul style="list-style-type: none"> • Safety gear • Workshop tools and equipment • Personal computer • Workshop stores • Workshop office • Tool ledger book 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			development plan					
		(c) Supervise junior workers	<p>Brainstorm: Guide students to discuss effective supervision techniques, including setting expectations, providing feedback, and fostering a supportive environment for junior workers to develop their skills.</p> <p>Conflict Scenarios: Present students with hypothetical conflicts (e.g., a disagreement between workers, a worker not following instructions) and have them role-play how to resolve the issue calmly and effectively.</p>	<ul style="list-style-type: none"> • Calculate total project cost • Prepare project write up • Select appropriate site for establishing workshop • Acquire land/building for setting up a workshop • Purchase tools and equipment • Supervise junior staff 	Managed workshop business conforms to stipulated regulations.	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to:</p> <ul style="list-style-type: none"> • Establish workshop business • Run workshop business • Analyse profit and loss <p>Principles: The student should explain principles of:</p> <ul style="list-style-type: none"> • Acquiring capital from financial institutions • Calculating business profit and loss • Managing private business workshop • Managing non private 	<p>The following tools, equipment and safety gear should be available:</p> <ul style="list-style-type: none"> • Workshop layout chart • Business films/video cassettes • Business magazines • Workshop business regulations • Scheduled maintenance of machines • Job card sheets • Safety gear • Workshop tools and equipment • Personal computer • Workshop stores • Workshop office • Tool ledger book 	6

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			Motivation Techniques: Discuss different ways to motivate workers, such as praise, setting achievable goals, and offering rewards. Role Play: Organise students into manageable groups, assign them roles as supervisors, and have them practice supervising junior workers by assigning tasks, overseeing their completion, and providing guidance and feedback			business workshop Theories: The student should explain: <ul style="list-style-type: none"> • Meaning of “business” • Meaning of workshop • Project write up procedures • Good customer care Circumstantial knowledge: Detailed knowledge about Safe handling of business capital.		
5.0 Managing Safe Work Environment	5.1 Managing Hazards	(a) Control mechanical hazards	Brainstorm: Guide students to understand and internalize the importance of workshop safety	<ul style="list-style-type: none"> • Interpret service manuals • Select tools and equipment 	Hazards, risks, incident and accidents are managed according to OSHA’s rules	Knowledge evidence: Detailed knowledge of: Method used: The student should	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Electrical equipment • Mechanical 	8

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>rules in preventing mechanical hazards.</p> <p>Multimedia Tools: Show videos or animations demonstrating hazard management techniques, such as proper lifting techniques or emergency response.</p> <p>Demonstration: Step by step, demonstrate safe operation procedures for tools like lathes, drills, and grinders, highlighting potential hazards and safety measures.</p> <p>Role-Playing: Organise students</p>	<ul style="list-style-type: none"> • Use OSHA rules and regulations • Prepare workshop inspection report • Prepare workshop colour code and safety signs • Identify any safety hazard materials • Handle hazards material 	and regulations	<p>explain how to:</p> <ul style="list-style-type: none"> • Interpret OSHA rules and regulations • Use safety gear • Prepare preventive maintenance schedule and inspection report • Prepare warning signs and safety instructions • Conduct assessment • Carry out accident investigation • Monitor safe working environment • Manage uses of safety gear <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Preparing inspection checklists 	<p>equipment</p> <ul style="list-style-type: none"> • Power machines • Measuring tools • Cutting tools • First aid kit • Fire extinguishers • Service manuals • OSHA rules and regulations • Helmet • Gloves • Ear plug • Mask • Gloves 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			into manageable groups, assign them roles (e.g., injured worker, responder) in scenarios such as a machine entanglement or tool malfunction. Students act out the situation and discuss their responses.			<ul style="list-style-type: none"> Preparing warning signs and safety instructions Identifying hazards materials Preparing and conducting training Handling hazard materials <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> Function of inspection checklist Importance of posting warning sign and safety instructions Advantages of risk assessment Importance of carry out accident investigation Importance of monitor safety at working 		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						place Circumstantial knowledge Detailed knowledge about: <ul style="list-style-type: none"> Safety precautions while manage hazards Safe handling of tools and equipment Waste disposal 		
		(b) Control chemical hazards	Brainstorm: Guide students to define and identify examples of chemical. Discuss how these hazards occur and their potential effects on health and safety Practical Demonstration: Guide students to properly handle chemicals, including	<ul style="list-style-type: none"> Interpret service manuals Select tools and equipment Use OSHA rules and regulations Prepare workshop inspection report Prepare workshop colour code and safety signs 	Hazards, risks, incident and accidents are managed according to OSHA's rules and regulations	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: <ul style="list-style-type: none"> Interpret OSHA rules and regulations Use safety gear Prepare preventive maintenance schedule and inspection report Prepare 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Electrical equipment Mechanical equipment Power machines Measuring tools Cutting tools First aid kit Fire extinguishers Service manuals OSHA rules and regulations Helmet Gloves 	8

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>transferring liquids, measuring substances, and using safety equipment like fume hoods.</p> <p>Activity: Organise students into manageable groups to handle a simulated chemical hazard, such as cleaning up a spill or evacuating safely.</p>	<ul style="list-style-type: none"> Identify any safety hazard materials Handle hazards material 		<p>warning signs and safety instructions</p> <ul style="list-style-type: none"> Conduct assessment Carry out accident investigation Monitor safe working environment Manage uses of safety gear <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> Preparing inspection checklists Preparing warning signs and safety instructions Identifying hazards materials Preparing and conducting training Handling hazard materials 	<ul style="list-style-type: none"> Ear plug Mask Gloves Computer 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						<p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Function of inspection checklist • Importance of posting warning sign and safety instructions • Advantages of risk assessment • Importance of carry out accident investigation • Importance of monitor safety at working place <p>Circumstantial knowledge</p> <p>Detailed knowledge about:</p> <ul style="list-style-type: none"> • Safety precautions while manage hazards • Safe handling of tools and equipment 		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						<ul style="list-style-type: none"> Waste disposal 		
		(c) Control Physical hazards	<p>Brainstorm: Guide students to discuss types of physical hazards (e.g., noise, vibration, radiation, extreme temperatures) and the importance of controlling these hazards through environmental controls and personal protective equipment (PPE).</p> <p>Demonstrations: Show students how to identify physical hazards in a practical environment.</p> <p>Role-Playing: Organise students into manageable groups, provide them with a</p>	<ul style="list-style-type: none"> Interpret service manuals Select tools and equipment Use OSHA rules and regulations Prepare workshop inspection report Prepare workshop colour code and safety signs Identify any safety hazard materials Handle hazards material 	Hazards, risks, incident and accidents are managed according to OSHA's rules and regulations	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to:</p> <ul style="list-style-type: none"> Interpret OSHA rules and regulations Use safety gear Prepare preventive maintenance schedule and inspection report Prepare warning signs and safety instructions Conduct assessment Carry out accident investigation Monitor safe working environment Manage uses of safety gear 	<p>The following tools, equipment and safety gear should be available:</p> <ul style="list-style-type: none"> Electrical equipment Mechanical equipment Power machines Measuring tools Cutting tools First aid kit Fire extinguishers Service manuals OSHA rules and regulations Helmet Gloves Ear plug Mask Gloves 	8

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			worksite scenario, and have them assess and apply physical hazard control measures, including the use of PPE and environmental adjustments, to improve safety.			<p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Preparing inspection checklists • Preparing warning signs and safety instructions • Identifying hazards materials • Preparing and conducting training • Handling hazard materials <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Function of inspection checklist • Importance of posting warning sign and safety instructions • Advantages of risk assessment 		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						<ul style="list-style-type: none"> Importance of carry out accident investigation Importance of monitor safety at working place <p>Circumstantial knowledge Detailed knowledge about:</p> <ul style="list-style-type: none"> Safety precautions while manage hazards Safe handling of tools and equipment Waste disposal 		
		(d) Control ergonomic hazards	Brainstorm: Guide students to discuss the types of ergonomic hazards (e.g., poor workstation design, repetitive motion, improper lifting techniques) and how controlling these hazards can	<ul style="list-style-type: none"> Interpret service manuals Select tools and equipment Use OSHA rules and regulations Prepare workshop inspection 	Hazards, risks, incident and accidents are managed according to OSHA's rules and regulations	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to:</p> <ul style="list-style-type: none"> Interpret OSHA rules and regulations Use safety gear Prepare 	<p>The following tools, equipment and safety gear should be available:</p> <ul style="list-style-type: none"> Electrical equipment Mechanical equipment Power machines Measuring tools Cutting tools First aid kit 	8

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>reduce strain and injury.</p> <p>Demonstrations: Show students the correct techniques for lifting heavy objects, adjusting workstations, or using ergonomic tools.</p> <p>Group Activity: Organise students into manageable groups, provide them with a scenario involving ergonomic hazards, and have them develop and demonstrate ergonomic improvements to the workspace, presenting their recommendations</p>	<p>report</p> <ul style="list-style-type: none"> • Prepare workshop colour code and safety signs • Identify any safety hazard materials • Handle hazards material • 		<p>preventive maintenance schedule and inspection report</p> <ul style="list-style-type: none"> • Prepare warning signs and safety instructions • Conduct assessment • Carry out accident investigation • Monitor safe working environment • Manage uses of safety gear <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Preparing inspection checklists • Preparing warning signs and safety instructions • Identifying hazards 	<ul style="list-style-type: none"> • Fire extinguishers • Service manuals • OSHA rules and regulations • Helmet • Gloves • Ear plug • Mask • Gloves 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						materials <ul style="list-style-type: none"> • Preparing and conducting training • Handling hazard materials Theories: The student should explain: <ul style="list-style-type: none"> • Function of inspection checklist • Importance of posting warning sign and safety instructions • Advantages of risk assessment • Importance of carry out accident investigation • Importance of monitor safety at working place Circumstantial knowledge Detailed knowledge about: <ul style="list-style-type: none"> • Safety 		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						precautions while manage hazards <ul style="list-style-type: none"> • Safe handling of tools and equipment • Waste disposal 		
	5.2 Carrying Out Risk Assessment	(a) Control risk	Brainstorm: Guide students to discuss risk identification, assessment, and control strategies, including elimination, substitution, engineering controls, and PPE. Technology Integration: Incorporate digital tools, such as simulations or virtual platforms, that present risk scenarios and allow students to experiment with control strategies. Demonstration: Utilize practical	<ul style="list-style-type: none"> • Interpret service manuals • Select tools and equipment • Supervise practice safe workshop practices to protect yourself, other and properties • React correctly and safely when faced with an emergency • Identify and apply correctly all emergency equipment 	Risk assessment carried out as per OSHA standard and automobile regulations	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: <ul style="list-style-type: none"> • Conduct safety training • Identify safety hazard material • Handle hazard material • Prepare inspection report Principles: The student should explain the principles of: <ul style="list-style-type: none"> • Reacting correctly and safely when faced with an emergency 	The following tools, equipment and safety gear are to be available: <ul style="list-style-type: none"> - • Service manuals • OSHA regulations • Workshop rules • Camera • Risk assessment sheet • Mask • Ear plug • Gloves • Overall • Safety boots • Safety clear glasses • Computer • Virtual reality devices 	10

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>demonstrations where students observe and then replicate safe practices or risk control measures in real time.</p> <p>Activity: Organise students into manageable groups, provide them with a risk scenario, and have them develop and present a comprehensive risk control plan with practical solutions</p> <p>Role-Playing: Assign students different roles in simulated scenarios where they must respond to and manage risks.</p>	<p>and supplies</p> <ul style="list-style-type: none"> • Make periodic inspections of workshop area and all equipment and prepare report • Conduct safety training • Identify any safety hazard material • Handle hazard material correctly • Prepare universal workshop colour codes and know what the colour represents • Make out and file safe report • Be aware of 		<ul style="list-style-type: none"> • Identifying and applying correctly all emergency equipment and supplies • Conducting safety training • Identifying safely hazards materials • Handling hazard materials <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> • Carry out risk assessment • Conducting safety training • Inspecting workshop areas, tools and equipment • Handling Hazard material correctly • Follow compressed air rules 		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
				<p>the dangerous of compressed air</p> <ul style="list-style-type: none"> • Ensure availability of personal protective equipment • Supervise compressed air rules • Monitor good environmental practices • Clean tools and equipment • Store tools and equipment 		<p>Circumstantial knowledge Detailed knowledge about:</p> <ul style="list-style-type: none"> • Safety precautions while carrying out risk management • Safe handling of tools and equipment • Waste disposal 		
		(b) Manage safety gear	Brainstorm: Guide students to discuss the importance of safety gear in protecting workers from hazards, including types	<ul style="list-style-type: none"> • Interpret service manuals • Select tools and equipment • Make periodic inspections 	Risk assessment carried out as per OSHA standard and automobile regulations	<p>Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to:</p> <ul style="list-style-type: none"> • Conduct safety training 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • Service manuals • OSHA regulations • Workshop rules • Camera • Risk assessment sheet 	10

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>of safety gear (e.g., helmets, gloves, goggles, ear protection) and their proper use.</p> <p>Practical demonstration: Guide students in selecting appropriate safety gear for various tasks, ensuring that gear is properly maintained, and training them on correct usage and inspection procedures.</p> <p>Group Activity: Organise students into manageable groups, provide them with different workplace scenarios, and have them select, inspect, and demonstrate the</p>	<p>of workshop area and all equipment and prepare report</p> <ul style="list-style-type: none"> • Ensure availability of personal protective equipment • Clean tools and equipment • Store tools and equipment 		<ul style="list-style-type: none"> • Identify safety hazard material • Handle hazard material • Prepare inspection report <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Reacting correctly and safely when faced with an emergency • Identifying and applying correctly all emergency equipment and supplies • Conducting safety training • Identifying safely hazards materials • Handling hazard materials <p>Theories: The student should</p>	<ul style="list-style-type: none"> • Mask • Ear plug • Gloves • Overall • Safety boots • Safety clear glasses 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			proper use of safety gear for each scenario			explain: <ul style="list-style-type: none"> • Carry out risk assessment • Conducting safety training • Inspecting workshop areas, tools and equipment • Handling Hazard material correctly • Follow compressed air rules Circumstantial knowledge Detailed knowledge about: <ul style="list-style-type: none"> • Safety precautions while carrying out risk management • Safe handling of tools and equipment • Waste disposal 		
	5.3 Managing Environment	(a) Managing air pollution	Brainstorm: Guide students to discuss the	<ul style="list-style-type: none"> • Select relevant safety gear 	Workshop environment managed as	Knowledge evidence: Detailed	The following tools, equipment and safety gear are to be available:	9

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>sources of air pollution (e.g., industrial emissions, vehicle exhaust, chemical fumes) and the importance of managing air quality to protect health and the environment.</p> <p>Visual aids: Use visual aids or experiments to demonstrate the effects of air pollution, such as how pollutants disperse in the air or the impact of poor air quality on plants.</p> <p>Role-Playing: Assign students roles, such as environmental activists, factory managers, or government</p>	<ul style="list-style-type: none"> • Prepare preventive maintenance schedule • Control environmental pollution • Maintaining safety environment • Managing safety personal environment • Control tools, equipment and safety gear • 	per rules and regulations	<p>knowledge of: Method used: The student should explain how to:</p> <ul style="list-style-type: none"> • Interpret OSHA rules and regulations • Prepare preventive maintenance schedule and inspection report • Monitor safe working environment • Control environment pollution • Control different types of wastes • Manage uses of safety gear <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Managing environment pollution • Handling 	<p>-</p> <ul style="list-style-type: none"> • Tool kit • Sprit level • Multimeter • Safety boots • Gloves • Overalls • Cleaning materials • Hoe • Broom • Brush • Safety gear • Dust covers • Dust mask • Dust bin • Wheel barrow 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>officials, and have them simulate a discussion or decision-making process on managing air pollution.</p> <p>Group Activities: Organise students into small groups and assign each group a specific air pollution source, such as transportation or industrial emissions. Have them research and present control measures, encouraging collaboration and deepening their understanding of different aspects of air pollution management.</p>			<p>environmental safety work</p> <ul style="list-style-type: none"> • Preparing and conducting training • Handling different types of wastes <p>Theories: The student should explain: -</p> <ul style="list-style-type: none"> • Student should explain the importance of safe work environment • Explain types of environmental pollution • Advantages of monitoring environmental pollution • Importance of preparing environmental schedule • Importance of controlling different types of waste 		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						Circumstantial knowledge Detailed knowledge about: <ul style="list-style-type: none"> Safety knowledge while managing environmental pollution Safe handling of tools and equipment Waste disposal 		
		(b) Managing water pollution	Brainstorm: Guide students to discuss the sources of water pollution (e.g., industrial waste, agricultural runoff, sewage), and the importance of controlling water pollution to protect ecosystems and public health. Demonstrations: Conduct	<ul style="list-style-type: none"> Select relevant safety gear Prepare preventive maintenance schedule Control environmental pollution Maintaining safety environment Managing safety personal environment Control 	Workshop environment managed as per rules and regulations	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: <ul style="list-style-type: none"> Interpret OSHA rules and regulations Prepare preventive maintenance schedule and inspection report Monitor safe working 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> Tool kit Sprit level Multimeter Safety boots Gloves Overalls Cleaning materials Hoe Broom Brush Safety gear Dust covers Dust mask Dust bin 	9

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>experiments that show the effects of pollutants, such as oil, detergents, or plastics, on water quality.</p> <p>Group Activities: Divide students into groups and assign each group a specific aspect of water pollution, such as point-source pollution, non-point-source pollution, or waterborne diseases. Ask them to research and present potential management solutions, fostering collaboration and comprehensive learning.</p>	<ul style="list-style-type: none"> tools, equipment and safety gear 		<p>environment</p> <ul style="list-style-type: none"> Control environment pollution Control different types of wastes Manage uses of safety gear <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> Managing environment pollution Handling environmental safety work Preparing and conducting training Handling different types of wastes <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> Student should explain the importance of safe work 	<ul style="list-style-type: none"> Wheel barrow 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			Field Visits: Organise visits to local rivers, lakes, or wastewater treatment facilities where students can observe real-world examples of water pollution management.			environment <ul style="list-style-type: none"> Explain types of environmental pollution Advantages of monitoring environmental pollution Importance of preparing environmental schedule Importance of controlling different types of waste Circumstantial knowledge Detailed knowledge about: <ul style="list-style-type: none"> Safety knowledge while managing environmental pollution Safe handling of tools and equipment Waste disposal 		
		(c) Managing land	Brainstorm:	<ul style="list-style-type: none"> Select 	Workshop	Knowledge	The following tools,	9

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
		pollution	<p>Guide students to discuss the causes of land pollution (e.g., waste disposal, industrial activities, deforestation) and the importance of managing land pollution to preserve the environment and reduce health risks.</p> <p>Technology Integration: Use digital tools or simulations to show students the impact of land pollution on the environment, such as the effects of improper waste disposal on soil health or the long-term consequences of</p>	<p>relevant safety gear</p> <ul style="list-style-type: none"> • Prepare preventive maintenance schedule • Control environmental pollution • Maintaining safety environment • Managing safety personal environment • Control tools, equipment and safety gear • 	environment managed as per rules and regulations	<p>evidence: Detailed knowledge of: Method used: The student should explain how to:</p> <ul style="list-style-type: none"> • Interpret OSHA rules and regulations • Prepare preventive maintenance schedule and inspection report • Monitor safe working environment • Control environment pollution • Control different types of wastes • Manage uses of safety gear <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Managing environment 	<p>equipment and safety gear should be available:</p> <ul style="list-style-type: none"> • Tool kit • Sprit level • Multimeter • Safety boots • Gloves • Overalls • Cleaning materials • Hoe • Broom • Brush • Safety gear • Dust covers • Dust mask • Dust bin • Wheel barrow • Computer 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			land degradation. Group Activities: Organise students into manageable groups and assign them different types of land pollution (e.g., plastic waste, chemical waste, or deforestation). Each group can research solutions, such as recycling, waste management, or sustainable land use practices, and then present their findings to the class.			pollution <ul style="list-style-type: none"> • Handling environmental safety work • Preparing and conducting training • Handling different types of wastes Theories: The student should explain: <ul style="list-style-type: none"> • Student should explain the importance of safe work environment • Explain types of environmental pollution • Advantages of monitoring environmental pollution • Importance of preparing environmental schedule • Importance of controlling 		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						different types of waste Circumstantial knowledge Detailed knowledge about: <ul style="list-style-type: none"> • Safety knowledge while managing environmental pollution • Safe handling of tools and equipment • Waste disposal 		
6.0 Managing Preventive Maintenance	6.1 Planning Preventive Maintenance	(a) Prepare schedules of preventive	Brainstorm: Guide the students to	<ul style="list-style-type: none"> • Interpret service manuals 	Preventive maintenance is planned as per	Knowledge evidence: Detailed	The following tools, equipment and safety gear are to be available:	15

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
ce		maintenance of tools, machines and equipment	<p>discuss the importance of preventive maintenance schedules, including the need for regular inspections, servicing, and timely repairs to extend the lifespan of tools, machines, and equipment.</p> <p>Demonstration: Demonstrate how to create maintenance schedules based on manufacturer recommendations, usage frequency, and equipment criticality, ensuring all tools, machines, and equipment are adequately covered.</p> <p>Group Activity:</p>	<ul style="list-style-type: none"> Read and apply workshop rules and regulations Select tools and equipment Prepare preventive maintenance programmes Prepare workshop preventive maintenance schedule Prepare and use workshop colour code and safety signs Clean tools and equipment Store tools and equipment 	workshop standards	<p>knowledge of:</p> <p>Method used: The student should explain how to:</p> <ul style="list-style-type: none"> Prepare workshop colour code and safety signed Plan and prepare preventive maintenance training <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> Preparing colour code and safety signs Preparing preventive maintenance schedule <p>Theories: The student should explain:</p> <ul style="list-style-type: none"> Importance of interpret service manuals Importance of 	<p>-</p> <ul style="list-style-type: none"> General hand foot kit Workshop tools, equipment and machines Service manuals Workshop rules and regulations Gloves Overall Safety boots Safety clear glasses Helmet Mask Ear plug 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			Organise students into manageable groups, provide them with a variety of tools, machines, and equipment, and have them prepare a detailed preventive maintenance schedule for each, outlining tasks, frequency, and responsible personnel.			preparing workshop inspection and maintenance schedule reports <ul style="list-style-type: none"> • Importance of preparing maintenance training programmes • Importance of Cleaning and storing tools and equipment Circumstantial knowledge Detailed knowledge about: <ul style="list-style-type: none"> • Safety precautions while planning preventive maintenance • Safe handling of tools and equipment • Waste disposal 		
		(b) Prepare inspection checklist of tools, equipment	Brainstorm: Guide students to discuss the key elements of an	<ul style="list-style-type: none"> • Interpret service manuals • Read and 	Preventive maintenance is planned as per workshop	Knowledge evidence: Detailed knowledge of:	The following tools, equipment and safety gear are to be available: -	15

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
		and machine	<p>inspection checklist, including safety checks, functionality, wear and tear, and compliance with operational standards.</p> <p>Demonstrations: Demonstrate how to prepare an inspection checklist by walking through an example tool or piece of equipment.</p> <p>Role-Playing: Have students take turns acting as maintenance inspectors and use a sample checklist to inspect different tools, equipment, or machines.</p> <p>Group Activity:</p>	<p>apply workshop rules and regulations</p> <ul style="list-style-type: none"> • Select tools and equipment • Make periodic inspection of workshop area and all equipment • Prepare workshop inspection report of tools and equipment • Plan and Prepare workshop inventory • Clean tools and equipment • Store tools and equipment 	standards	<p>Method used: The student should explain how to:</p> <ul style="list-style-type: none"> • Prepare workshop inspection report • Plan and prepare workshop inventory <p>Principles: The student should explain the principles of:</p> <ul style="list-style-type: none"> • Plan and prepare workshop inventory <p>Theories: The student should explain: -</p> <ul style="list-style-type: none"> • Importance of interpret service manuals • Importance of preparing workshop inspection and maintenance schedule 	<ul style="list-style-type: none"> • General hand foot kit • Workshop tools, equipment and machines • Service manuals • Workshop rules and regulations • Gloves • Overall • Safety boots • Safety clear glasses • Helmet • Mask • Ear plug 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			Organise students into manageable groups, assign them different tools, equipment, or machines, and have them develop an inspection checklist, then practice using it to conduct a mock inspection.			reports <ul style="list-style-type: none"> • Importance of preparing maintenance training programmes • Importance of Cleaning and storing tools and equipment Circumstantial knowledge Detailed knowledge about: <ul style="list-style-type: none"> • Safety precautions while planning preventive maintenance • Safe handling of tools and equipment • Waste disposal 		
	6.2 Supervising Preventive Maintenance	(a) Performing preventive maintenance of tools, equipment and machines	Brainstorm: Guide students to discuss the importance of preventive maintenance, including tasks like cleaning, lubricating,	<ul style="list-style-type: none"> • Interpret service manuals • Read and apply rules and regulations • Prepare and apply 	Preventive maintenance of tools, equipment, machines and building are performed as per workshop standards	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: <ul style="list-style-type: none"> • Plan and conduct 	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • General hand foot kit • Workshop tools, equipment and machines • Service manuals 	10

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			adjusting, and replacing worn parts to keep tools, equipment, and machines in optimal working condition. Demonstrations: Provide live demonstrations where you show the step-by-step process of performing preventive maintenance on different tools and machines. Group Activity: Organise students into manageable groups, provide them with various tools, equipment, or machines, and have them perform preventive maintenance tasks,	workshop inspection report <ul style="list-style-type: none"> • Prepare and use safety signs and colour code 		preventive maintenance training <ul style="list-style-type: none"> • Prepare safety signs and colour code • Correct hand tools and equipment safety Principles: The student should explain the principles of: <ul style="list-style-type: none"> • Preparing and applying preventive maintenance schedule • Preparing and use safety signs and colour code • Correct hand tools and equipment safety • Practice correct lift and jack safety • Plan and conduct preventive 	<ul style="list-style-type: none"> • Workshop rules and regulations • Gloves • Overall • Safety boots • Safety clear glasses • Helmet • Mask • Ear plug 	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			documenting their actions and checking for proper functioning afterward			maintenance training Theories: The student should explain: - <ul style="list-style-type: none"> • Importance of preparing and applying preventive maintenance schedule • Importance of Preparing and use safety signs and colour code • Importance of Planning and conducting preventive maintenance training • Importance of follow good environmental practices Circumstantial knowledge Detailed knowledge about: <ul style="list-style-type: none"> • Safety precautions while planning 		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						preventive maintenance <ul style="list-style-type: none"> • Safe handling of tools and equipment • Waste disposal 		
		(b) Performing preventive maintenance of working environment	Brainstorm: Guide students to discuss the importance of preventive maintenance in the workplace, including regular checks, cleaning, and repairs to ensure smooth operations and minimize downtime. Demonstrations: Guide students in performing preventive maintenance on workplace equipment, systems, and tools, ensuring compliance with safety standards	<ul style="list-style-type: none"> • Read and apply rules and regulations • Prepare and apply workshop inspection report • Prepare and use safety signs and colour code • Prepare and apply workshop preventive maintenance schedule 	Preventive maintenance of tools, equipment, machines and building are performed as per workshop standards	Knowledge evidence: Detailed knowledge of: Method used: The student should explain how to: <ul style="list-style-type: none"> • Prepare and apply workshop preventive schedule • Plan and conduct preventive maintenance training • Prepare safety signs and colour code • Good electrical safety • Follow good environmental practices Principles: The	The following tools, equipment and safety gear should be available: <ul style="list-style-type: none"> • General hand foot kit • Workshop tools, equipment and machines • Service manuals • Workshop rules and regulations • Gloves • Overall • Safety boots • Safety clear glasses • Helmet • Mask • Ear plug 	10

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
			<p>and operational requirements.</p> <p>Group Activity: Organise students into manageable groups, assign different areas of the workplace, and have them perform preventive maintenance tasks, such as checking equipment, lubricating moving parts, and identifying potential issues</p>			<p>student should explain the principles of:</p> <ul style="list-style-type: none"> • Preparing and applying preventive maintenance schedule • Preparing and use safety signs and colour code • Plan and conduct preventive maintenance training <p>Theories: The student should explain: -</p> <ul style="list-style-type: none"> • Importance of preparing and applying preventive maintenance schedule • Importance of Preparing and use safety signs and colour codes • Importance of Planning and 		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Services Assessment	Knowledge Assessment		
						conducting preventive maintenance training <ul style="list-style-type: none"> • Importance of follow good environmental practices Circumstantial knowledge Detailed knowledge about: <ul style="list-style-type: none"> • Safety precautions while planning preventive maintenance • Safe handling of tools and equipment • Waste disposal 		

Bibliography

Ministry of Education, Science and Technology. (2023). *Syllabus for Ordinary Secondary Education, Form I–IV*. Dar es Salaam: Tanzania Institute of Education.

Vocational Education and Training Authority. (2022). *Curriculum for Electronics*.