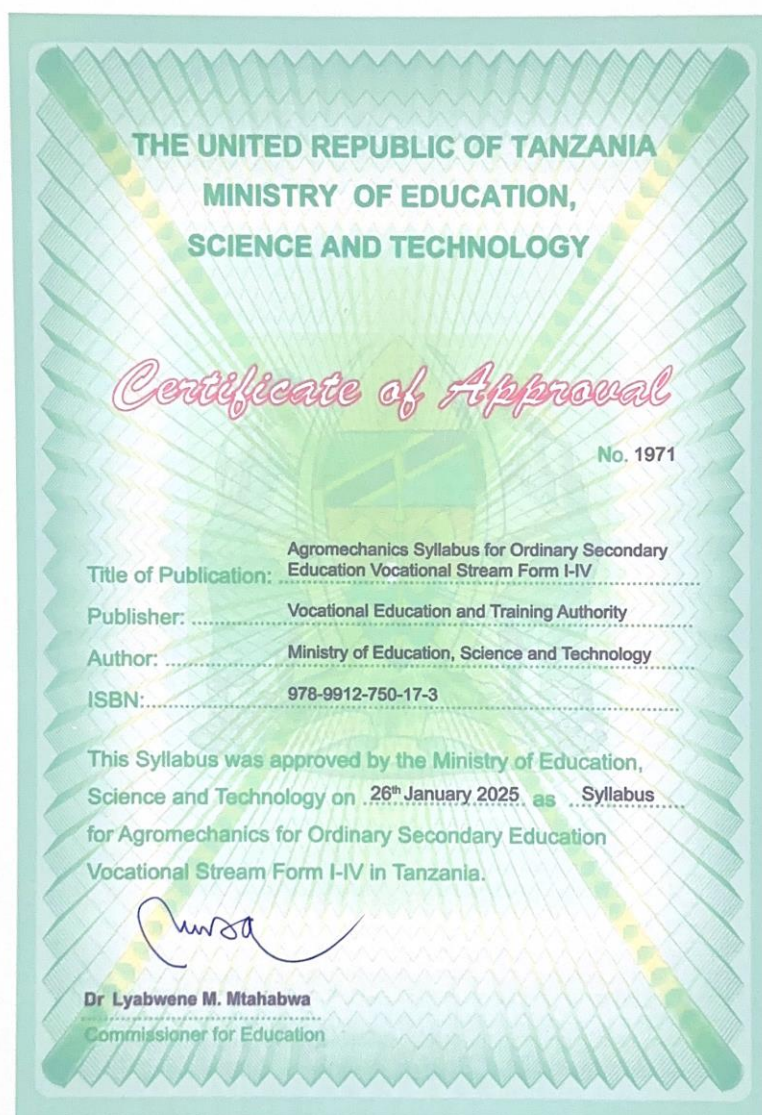


THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY



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

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Abbreviations and Acronyms

A/C	Air Conditioning
ABS	Antilock Braking System
AC	Alternating Current
ATF	Automatic Transmission Fluid
CBET	Competence Based Education and Training
CNG	Compressed Natural Gas
DC	Direct Current
ECU	Electronic Control Unit
EFI	Electronic Fuel Injection
GPS	Global Positioning System
LED	Light Emitting Diode
LPG	Liquefied Petroleum Gas
LPO	Local Purchasing Order
MIG	Manganese Inert Gas
OSHA	Occupational Safety and Health Administration
PDI	Pre-delivery Inspection
PTO	Power Take Off
SAE	Society of Automotive Engineers
SST	Special Service Tool
T	Torque
TIG	Tungsten Inert Gas
VETA	Vocational Education and Training Authority

Definition of Key Terms

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

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

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

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

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

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

Knowledge assessment: This is essential knowledge needed in order to demonstrate competences that are associated in performing a given task.

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

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For and on behalf of:

Vocational Education and Training Authority



CPA. Anthony M. Kasore

Director General

1.0 Introduction

Agromechanics is one of the occupations taught in the Ordinary Secondary Education Vocational Stream. Learning agromechanics is essential because Tanzania is an agricultural country with vast potential for modernization and mechanization. By teaching agromechanics, students will develop knowledge and practical skills to operate, maintain, and repair agricultural machinery and equipment. These skills enable them to support farming activities, such as land preparation, irrigation, planting, harvesting, and post-harvest handling. This fosters efficiency in agricultural production, reduces post-harvest losses, and enhances food security. In return, this will foster economic development, create jobs, promote environmental sustainability, and modernize Tanzania's agricultural sector

1.1 Meaning of Occupation

An occupation is a specific work area or a group of related job roles that demand particular skills, knowledge, and competences. It encompasses a structured professional activity within the labor market, marked by distinct tasks, responsibilities, and established standards of practice.

In the context of Agromechanics, the occupation refers to tasks performed within the agricultural machinery and mechanization industry, related to the operation, maintenance, and repair of agricultural equipment and systems. Agromechanics involves optimizing the use of machinery for farming activities such as plowing, planting, irrigation, harvesting, and post-harvest handling to improve efficiency and productivity in agriculture.

Agromechanics can describe various types of procedures used to manage, repair, and enhance the performance of agricultural machinery and technologies. It ensures that equipment is used effectively, reducing labor intensity, minimizing operational costs, and supporting sustainable agricultural practices.

Upon completion of the program, students will possess both theoretical knowledge and practical skills of agromechanics, from understanding agricultural machinery and systems to advanced mechanization procedures. They will be capable of operating, maintaining, and repairing farming equipment, enhancing agricultural productivity, and implementing sustainable practices in the mechanization sector, all while adhering to safety regulations. Additionally, students will be equipped with the business skills necessary for managing an agromechanics enterprise, ensuring high standards of quality and innovation in all aspects of the agricultural machinery industry.

A graduate in this occupation can find employment in the following sectors. A graduate of this occupation may be employed in both government and private sectors such as ministries/departments, training institutions, research institutions, agricultural agencies and projects, self-employment, small, medium, and large agricultural mechanization enterprises, and in Non-Governmental Organizations (NGOs).

The Agromechanics Syllabus is designed to guide the teaching and learning of Agromechanics at Ordinary Secondary Education Form I-IV Vocational Stream in the United Republic of Tanzania. The syllabus interprets the competences a student needs to develop while learning Agromechanics. 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 the society, gender equality, as well as the management and sustainable conservation of the environment; and
- (h) Develop national and international cooperation, peace and justice per the Constitution of the United Republic of Tanzania and international conventions.

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

4.0 General Competences of the Occupation

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

- (a) Managing agricultural machines systems and renewable energy sources
- (b) Performing bench works, welding processes and lathe machine works.
- (c) Perform crop production , Farm machinery operation and Using organic fertilizers and herbicides

5.0 Main and Specific Competences

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

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

Main competences	Specific competences
1.0 Maintaining safety of workshop and surroundings	1.1 Maintaining workshop safety
	1.2 Handling accidents and incidents
	1.3 Handling fire accidents
	1.4 Performing first aid

Main competences	Specific competences
2.0 Performing preventive maintenance of tools, equipment and machines	2.1 Conducting preventive maintenance of work tools
	2.2 Maintaining machines
3.0 Performing bench works	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 welding process	4.1 Performing arc welding
	4.2 Performing gas welding
	4.3 Performing soldering
5.0 Carrying out basic auto-electric works general maintenance of electric and electronic systems	5.1 Performing battery maintenance
	5.2 Servicing electrical and electronic circuits
	5.3 Servicing conventional ignition systems
	5.4 Servicing lighting system
	5.5 Servicing auxiliary circuits and components
6.0 Carrying out general tractor service	6.1 Servicing engine lubrication systems
	6.2 Servicing fuel systems
	6.3 Servicing engine cooling systems
	6.4 Servicing transmission systems
	6.5 Performing greasing
7.0 Carrying out repair of wheels and tyres	7.1 Replacing tyres
	7.2 Repairing tube and tubeless tyres
	7.3 Performing wheel balancing

Main competences	Specific competences
	7.4 Servicing wheel hubs
8.0 Servicing steering system	8.1 Performing wheel alignment
	8.2 Servicing steering box
	8.3 Servicing power steering systems
9.0 Repairing brake system	9.1 Servicing hydraulic brakes system
	9.2 Servicing antilock braking system (abs)
10.0 Maintaining suspension systems	10.1 Replacing suspension bushes
	10.2 Replacing suspension shock absorbers
	10.3 Replacing steel suspension springs
11.0 Carrying out engine maintenance	11.1 Performing engine non-destructive tests
	11.2 Adjusting valve clearance
	11.3 Setting ignition timing
12.0 Performing lathe machine works	12.1 Performing turning
	12.2 Performing thread cutting
	12.3 Performing boring
13.0 Maintaining animal draught implements	13.1 Servicing animal draught implements
	13.2 Servicing animal draught planters
14.0 Maintaining grass cutting machines	14.1 Servicing forage harvesters
	14.2 Servicing balling machines
15.0 Operating farm machinery and equipment	15.1 Operating tillage machinery
	15.2 Operating cultivating machines
	15.3 Operating harvesting machines
16.0 Project	16.1 Project
17.0 Overhauling engines	17.1 Dismantling engines

Main competences	Specific competences
	17.2 Servicing cylinder heads
	17.3 Performing cylinder block measurements
	17.4 Performing crankshaft measurements
	17.5 Performing camshaft measurements
	17.6 Checking connecting rods
	17.7 Checking piston wear
	17.8 Assembling engines
18.0 Maintaining fuel systems	18.1 Servicing petrol fuel systems
	18.2 Repairing natural gas fuel systems
	18.3 Servicing diesel fuel systems
19.0 Maintaining emission control system	19.1 Servicing catalytic converter
	19.2 Servicing oxygen sensor
	19.3 Repairing muffler and pipes
20.0 Servicing hydraulic system	20.1 Repairing hydraulic pipes
	20.2 Servicing hydraulic actuators
21.0 Servicing transmission system.	21.1 Servicing clutch systems
	21.2 Overhauling manual gear box
	21.3 Overhauling final drive unit
	21.4 Servicing automatic transmission system
22.0 Carrying out advanced welding process	22.1 Performing TIG and MIG welding
	22.2 Performing resistance welding
	22.3 Performing butt fusion welding
23.0 Maintaining tillage machinery	23.1 Performing maintenance of tillage machinery
	23.2 Servicing cultivators / weederers
24.0 Maintaining spraying machinery	24.1 Servicing boom sprayers

Main competences	Specific competences
	24.2 Servicing hand sprayers
	24.3 Performing crop protection
25.0 Maintaining agricultural processing machines	25.1 Performing maintenance of shellers and threshers machine
	25.2 Performing maintenance of pulping machines
	25.3 Performing maintenance of decorticating machines
	25.4 Servicing milking machines
	25.5 Servicing feed mixer
	25.6 Servicing choppers
	25.7 Servicing grain processing machines
	25.8 Servicing cassava processing machines
	25.9 Servicing oil expellers
	25.10 Performing palletizer machine
	25.11 Performing husky machine operation
26.0 Project	26.1 Project
27.0 Maintaining planting machinery	27.1 Maintaining tractor drawn machine
	27.2 Maintaining transplanting equipment
28.0 Maintaining fertilizer machinery	28.1 Performing maintenance of fertilizer applicators and distributors equipment
	28.2 Performing maintenance of manure spreader equipment
29.0 Using organic fertilizers and herbicides	29.1 Applying organic fertilizers
	29.2 Applying organic herbicides
30.0 Managing safe working environment	30.1 Managing hazards
	30.2 Carrying out risk assessment
	30.3 Managing environment

Main competences	Specific competences
31.0 Managing preventive maintenance	31.1 Planning preventive maintenance
	31.2 Supervising preventive maintenance
32.0 Maintaining agricultural machinery	32.1 Servicing harvesters
	32.2 Operating agricultural machinery
33.0 Servicing agricultural pumps	33.1 Servicing centrifugal pumps
	33.2 Servicing plunger pumps
	33.3 Servicing impeller pumps
	33.4 Servicing gear type pumps
	33.5 Servicing piston pumps
	33.6 Servicing diaphragm pumps
	33.7 Servicing submersible pumps
	33.8 Performing irrigation
34.0 Managing agricultural machinery	34.1 Performing land surveying
	34.2 Constructing green houses
	34.3 Keeping machinery records
	34.4 Selecting proper machinery
35.0 Maintaining renewable energy resources	35.1 Performing maintenance of wind mills
	35.2 Servicing solar energy components
	35.3 Constructing biogas production system
36.0 Managing agro-mechanics workshop	36.1 Designing farm workshop layout
	36.2 Controlling agricultural tools and equipment
	36.3 Estimating material and labour cost
	36.4 Training sub-ordinates on the job
	36.5 Preparing reports
	36.6 Managing agricultural workshop business

Main competences	Specific competences
37.0 Project	37.1 Project

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

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

6.1 The teacher

The teacher is expected to:

- (a) Help students to learn and develop the intended competences in Agromechanics
- (b) Use teaching and learning approaches that will allow students with different needs and abilities to:
 - (i) Develops the competences needed in the 21st Century; and
 - (ii) Actively participate in the teaching and learning process.
- (c) Use student centered instructional strategies that make students a centre of learning which allow them to think, reflect and search for information from various sources;
- (d) Create a friendly teaching and learning environment;
- (e) Prepare and improvise teaching and learning resources;
- (f) Conduct formative assessment regularly by using tools and methods which assess theory and practice;
- (g) Treat all students according to their learning needs and abilities;
- (h) Protect students from the risky environment while he or she is at school;
- (i) Keep track of students's daily progress;
- (j) Identify individual student's needs and provide the proper intervention;
- (k) Involve parents/guardians and the society at large in students's learning process; and
- (l) Integrate cross-cutting issues and ICT in the teaching and learning process.

6.2 Students

Students is expected to:

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

learning activities inside and outside the classroom; and

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

6.3 The parent/guardian

The Parents/Guardian is expected to:

- (a) Monitor the child's academic progress in school;
- (b) Where possible, provide a child with the needed academic support;
- (c) Provide a child with a safe and friendly home environment which is conducive for learning;
- (d) Keep track of a child's progress in behavior;
- (e) Provide the child with any necessary materials required in the learning process; and
- (f) Instill in a child a sense of commitment and positive value towards education and work.

7.0 Teaching and Learning Methods

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

8.0 Teaching and Learning Resources

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

provided by the Tanzania Institute of Education (TIE).

9.0 Assessment

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

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

9.1 Project Work

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

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

Assessment Category	Weight (%)	National Examination
Form Two National Assessment (FTNA)	6.0	
Form Three Terminal Examination	5.0	
Form Three Annual Examination	5.0	

Assessment Category	Weight (%)	National Examination
Form Four Mock Examination	7.0	40
Project	7.0	
Form Two Practical	10.0	
Form Three Practical	10.0	
Form Four Practical	10.0	
Total	60	

10.0 Number of Periods

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

11.0 Teaching and Learning Contents

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

Form One

Table 3: Detailed contents for Form One

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Num ber of Perio ds per Unit
				Process Assessment	Product/S ervices Assessme nt	Knowledge Assessment		
1.0. Maintaining Safety of Workshop and Surroundings	1.1. Maintaining workshop safety	(a) Maintaining workshop safety rules	Discussion Guide students to describe the concept of workshop safety rules Practical work Guide student on how to maintain workshop safety rules Activity Organize student in manageable group to maintain workshop safety rules	Students should be able to: • Select relevant safety gears • Maintain workshop safety rules • Take precautions against health and safety hazards • Interpret different safety signs in a workshop • Draw safety signs • Clean workshop, tools, equipment	Safety of workshop maintained as per safety rules and regulations	Knowledge evidence of: Method used: Students should explain how to: • Maintain workshop safety Principles: Students should explain principles of: • Storing different types of tools and equipment used in the occupation Theories: Students should explain:- • Possible workshop accidents, their causes and prevention • Purpose of each safety gear • Different safety sign and their importance	The following tools , equipment and safety gears are to be available: • Tool kit • Safety boots • Cleaning materials • Hoe • Broom • Brush • Safety gears	22

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				and workshop surroundings • Store tools, equipment and safety gear • Use safety gears • Dispose different types of wastes		Circumstantial knowledge Detailed knowledge about: • OSHA rules and regulations • Waste disposal procedures • Workshop rules and regulations		
		(b) Maintaining workshop working environment	Question and answer Lead students to describe concept of workshop working environment Practical work Guide student on how to maintain workshop working environment Activity Organize student in manageable group to maintain workshop	Students should be able to: • Select relevant safety gears • Draw safety signs • Maintain safe working environment • Clean workshop, tools, equipment	Safety of workshop environment maintained as per safety rules and regulations.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Maintain workshop working environment Principles: Students should explain principles of: • Workshop management Theories: Students should explain:- • Classification of	The following tools, equipment and safety gears are to be available: • Tool kit • Safety boots • Gloves • Overalls • Cleaning materials • Hoe • Broom • Brush • Dust cover • Dust mask • Dust bins	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			working environment	and workshop surroundings • Store tools, equipment and safety gear		wastes and their hazards • Importance of cleaning a workshop and surrounding • Different safety sign and their importance Circumstantial knowledge Detailed knowledge about: • OSHA rules and regulations • Waste disposal procedures • Workshop rules and regulations		
		(c) Maintain personal safety	Brainstorm Guide students to define terms, identify proper wearing of PPE Demonstration Demonstrate to students on how to wear PPE properly Activity	Students should be able to: • Select relevant safety gears • Interpret different safety signs in a workshop • Draw	Personal safety maintained as per safety rules and regulations	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Maintain personal safety while in workshop Principles: Students should explain principles of:	The following tools, equipment and safety gears are to be available: • Tool kit • Safety boots • Gloves • Overalls • Cleaning materials • Hoe	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Organize students in manageable group to maintain personal safety through proper wearing of PPE while working in the workshop	safety signs • Maintain personal safety		• Wearing PPE • Ergonomics and handling tools and equipment in the workshop Theories: Students should explain:- • Importance of maintaining personal safety • Different safety sign and their importance Circumstantial knowledge Detailed knowledge about: • OSHA rules and regulations • Workshop rules and regulations	• Broom • Brush • Dust covers • Dust mask • Dust bins	
	1.2 Handling accidents and incidents	(a) Handling mechanical hazards	Discussion Guide students to define terms, identify mechanical hazards Practical work Guide student on how to handle mechanical hazards	Students should be able to: • Handle mechanical hazards • Use service manual • Interpret workshop	Mechanical hazards handled according to workshop rules and regulations	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Handle mechanical hazards Principles: Students should explain the principles of:	The following tools, equipment and safety gears are to be available: • Tool kit • motorcycle mechanical equipment • Air	46

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Num ber of Perio ds per Unit
				Process Assessment	Product/S ervices Assessme nt	Knowledge Assessment		
			Activity Organize student in manageable group to handle mechanical hazards	rules and regulations - Identify and apply all emergency equipment and supplies - Make periodic inspection of workshop area and equipment - Handle hazard material - Use color code and know what each color represent - Handle mechanical equipment - Follow good environmental		- Handling mechanical hazardous materials Theories: Students should explain:- - Identifying mechanical hazard materials - Importance of reading manufacturer's instruction before operating machine Circumstantial knowledge Detailed knowledge about: - Safe handling of tools, equipment and machines	compressor - Fire extinguisher - Power Machines - Overalls - Gloves - Safety boots - Safety clear glasses - Helmet - Ear plug - Mask - Workshop rules and regulations guidelines - Service manual	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				practices • Use safety gears • Clean tools, equipment and workplace • Store tools and equipment				
		(b) Handling Physical hazards	Discussion Guide students to define terms, identify possible physical hazard materials around the school premises Practical work Guide student on how to handle physical hazards Activity Organize student in manageable group to handle physical hazards	Students should be able to: • Use service manual • Interpret workshop rules and regulations • Use color code and know what color represent • Follow good environmental practices • Use safety	Physical hazards handled according to workshop rules and regulations	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: Handle Physical hazards Principles: Students should explain the principles of: Handling physical hazardous materials Theories: Students should explain:- • Advantages of handling physical hazards • Reading manufacturer's instruction before	The following tools, equipment and safety gears are to be available: • Tool kit • motorcycle mechanical equipment • Air compressor • Fire extinguisher • Power Machines • Overall • Gloves • Safety boots • Safety clear glasses	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				gears • Clean tools, equipment and workplace • Store tools and equipment		operating machine Circumstantial knowledge Detailed knowledge about: • Workshop Safety rule and regulations	• Helmet • Ear plug • Mask • Workshop rules and regulations guidelines • Service manual	
		(c) Handling chemical hazards	Brainstorm Guide students to define terms, identify possible chemical hazard materials around the school premises Practical work Guide students on how to handle chemical hazards Activity Organize students in manageable group to handle chemical hazards	Students should be able to: • Use service manual • Interpret workshop rules and regulation • Identify chemical hazard material • Handle chemical hazard material • Use color code and know what color	Chemical hazards handled according to workshop rules and regulations	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Handle chemical hazards Principles: Students should explain the principles of: Handling chemical hazardous materials Theories: Students should explain:- • Effects of chemical hazards Circumstantial knowledge Detailed knowledge about: • Workshop rules	The following tools, equipment and safety gears are to be available: • Tool kit • motorcycle mechanical equipment • Air compressor • Fire extinguisher • Overalls • Safety boots • Safety clear glasses • Helmet • 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	Product/Services Assessment	Knowledge Assessment		
				- represent - Follow good environmental practices - Clean tools, equipment and workplace - Store tools and equipment		- and regulations - Waste disposal regulations	- Workshop rules and regulations guidelines - Service manual	
		(d) Handling electrical hazards	Brainstorm Guide students to define terms, Identify electrical hazard materials Practical work Guide student on how to handle electrical hazards Activity Organize students in manageable group to handle electrical hazards	Students should be able to: - Use service manual - Interpret workshop rules and regulations - Identify electrical hazard material - Handle electrical hazards material	Electrical hazards handled according to workshop rules and regulations	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Identify electrical hazard materials - Handle electrical hazards materials - Use safety gears Principles: Students should explain the principles of: - Handling electrical hazardous materials Theories: Students	The following tools, equipment and safety gears are to be available: - Tool kit - motorcycle mechanical equipment - Air compressor - Fire extinguisher - Power Machines - Overalls - Safety boots	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Num ber of Perio ds per Unit
				Process Assessment	Product/S ervices Assessme nt	Knowledge Assessment		
				• Use color code and know what color represent • Handle electrical hazards equipment • Follow compressed air rule • Follow good environmental practices • Use safety gears • Clean tools, equipment and workplace • store tools and equipment		should explain:- • Effects of electrical hazards. • Identifying electrical hazard materials Circumstantial knowledge Detailed knowledge about: • IEE Regulations • OSHA • Waste disposal methods	• Safety clear glasses • poster • Helmet • Ear plug • Mask • Gloves • Workshop rules and regulations guidelines • Service manual	
		(e) Maintaining safety gears	Discussion Lead students to define terms, identify safety gears	Students should be able to • Use safety	safety gears maintained	Knowledge evidence: Detailed knowledge of: Method used: Students should explain	The following tools, equipment and safety gears are to be	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Practical work Guide students on how to properly wear safety gears Activity Organize students in manageable group to maintain safety gears	gears - Wear proper safety gears - Clean tools, equipment and workplace Store tools and equipment	according to workshop rules and regulations	how to: - How to wear proper personal protective equipment(PPE) Principles: Students should explain the principles of: workshop safety rules and regulation Theories: Students should explain: - Importance of using safety gears - Importance of wearing proper PPE Circumstantial knowledge Detailed knowledge about: - OSHA rules and regulations while working with machines - Safe handling of tools, equipment and machines - Waste disposal methods	available: - Tool kit - Overall - Gloves - Safety boots - Safety clear glasses - Helmet - Ear plug - Mask - Workshop rules and regulations guidelines - Service manual	
	1.3	(a) Handling	Discussion	Students	Firefightin	Knowledge evidence:	The following	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	Product/Services Assessment	Knowledge Assessment		
	Handling fire accidents	firefighting equipment and materials	Guide students to define terms, identify firefighting equipment Demonstration Guide students on how to handle firefighting, equipment Activity Organize students in manageable group to handle firefighting equipment and materials	should be able to: • Select tools, equipment and safety gear • Identify firefighting equipment and materials • Handle firefighting equipment and materials • Check and test fire extinguishers • Clean up tools, equipment and working place • Store tools, equipment and safety gears	g equipment handled as per rules and regulations.	Detailed knowledge of: Method used: Students should explain: • Procedures for Handling firefighting equipment and material. • Principles: Students should explain the principles of: Handling firefighting materials • Theories: Students should explain:- • Importance of handling fire accidents • Importance of checking and servicing fire extinguishers Circumstantial knowledge Detailed knowledge about: • Safety precautions while handling fire	tools, equipment and safety gears are to be available: • 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	Num ber of Perio ds per Unit
				Process Assessment	Product/S ervices Assessme nt	Knowledge Assessment		
						accidents • Safe handling of firefighting equipment and materials • Waste disposal methods.		
		(b) Handling different types of fire	Discussion Guide students to define terms, identify different types of fire Practical work Guide students on how to handle tools, equipment for firefighting safely Activity Organize students in manageable group to handle different types of fire	Students should be able to: • Select tools, equipment and safety gears • Identify common classes of fire • Identify combustible material • React correctly and safely when faced with different types of fire • Apply right	Different types of fire handled as per rules and regulations.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain : • Procedure for handling • Apply right type of firefighting materials Principles: Students should explain the principles of: • Handling fire • Theories: Students should explain:- • Importance of handling fire accidents • Fire triangle • Types and common classes of fire • Handle different	The following tools, equipment and safety gears are to be available: • 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	Product/Services Assessment	Knowledge Assessment		
				class of fire extinguisher • Handle different types of fire • Check and test fire extinguishers • Clean up tools, equipment and working place • Store tools, equipment and safety gears		types of fire Circumstantial knowledge Detailed knowledge about: • Safety precautions while handling fire accidents • Safe handling of tools and equipment • Waste disposal methods.		
	1.4 Performing first aid	(a) Performing artificial respiration	Brainstorm Guide students to define terms, identify methods for performing artificial respiration Practical work Guide students on how to perform	Students should be able to: • Select tools and equipment • Perform artificial respiration • Sterilize	Artificial respiration performed conforms to medical requirements.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to perform artificial respiration. Principles: Students should explain principles of:-	The following tools, equipment and safety gears are to be available: • First aid Kit. • Stretcher. • Light blanket. • Sterilizer. • Towel	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	Product/Services Assessment	Knowledge Assessment		
			artificial respiration Activity Organize students in manageable group to perform artificial respiration	first aid tools. - Observe safety precautions - Store first aid kit		Performing artificial respiration. Theories: Students should explain: - The use of accessories in a first aid kit. - Methods of performing artificial respiration - Importance of performing artificial respiration. Circumstantial knowledge Detailed knowledge about: - Safety precautions to be observed while performing first aid. - Safe handling of first aid kit. - Waste disposal	- Overall. - Medical gloves. - Safety boots.	
		(b) Performing first aid to minor wound scalpels.	Brainstorm Guide students to define, Identify types of minor wounds materials	Students should be able to: Select tools and equipment	First aid offered conforms to medical requirements.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to perform first aid	The following tools, equipment and safety gears are to be available: First aid Kit.	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Num ber of Perio ds per Unit
				Process Assessment	Product/S ervices Assessme nt	Knowledge Assessment		
			Practical work Guide students on how to perform first aid to minor wound scalpels Activity Organize students in manageable group to perform first aid to minor wound scalpels	- Identify types of injuries. - Perform first aid to minor wound scalpels - Sterilize first aid tools. - Observe safety precautions - Store first aid kit.		to minor wound scalpels. Principles: Students should explain principles of:- - Attending minor wounds. - Providing first aid. Theories: Students should explain:- - Different types of wounds. - Different types of accidents Circumstantial knowledge Detailed knowledge about: - Safety precautions to be observed while performing first aid. - Safe handling of first aid kit. - Waste disposal.	- Stretcher. - Light blanket. - Sterilizer. - Towel - Overall. - Medical gloves. - Safety boots.	
2.0. Performing preventive maintenance of tools, machines and equipment	2.1 Conducting Preventive Maintenance Of Work Tools	(a) Maintaining measuring tools	Brainstorm Guide students to define, Identify measuring tools Practical work	Students should be able to: - Use service manual - Select tools	Measuring tools maintained as per required standard	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to:	The following tools, equipment and safety gears are to be available: Measuring	34

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Num ber of Perio ds per Unit
				Process Assessment	Product/S ervices Assessme nt	Knowledge Assessment		
			Guide students on how to maintain measuring tools Activity Organize students in manageable group to maintain measuring tools in the workshop	and equipment • Interpret service manuals for different tools • Select tools, equipment and materials • Check functionality of measuring tools • Identify fault tools		• Maintain measuring tools Principles: Students should explain the principles of: • Maintaining measuring tools Theories: Students should explain:- • Function of different types of hand tools • Importance of preventive maintenance of tools Circumstantial knowledge Detailed knowledge about: • Safety precautions while handling measuring tools	tools • Oil can • Service manual • Preventive maintenance schedule • Gloves • Safety boot • Safety clear glasses • Air compressor	
		(b) Maintaining general hand tools	Brainstorm Guide students to define terms, identify hand tools Practical work Guide students on how to handle tools,	Students should be able to: • Use service manual • Interpret service manuals for	Hand tools maintained as per required standard	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Service basic tools • Stores basic tools	The following tools, equipment and safety gears are to be available: • Basic tools • Oil can • Service	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Num ber of Perio ds per Unit
				Process Assessment	Product/S ervices Assessme nt	Knowledge Assessment		
			equipment and machines safely Activity Organize students in manageable group to maintain general hand tools	different tools • Select tools, equipment and materials • Identify fault tools • Perform greasing • Observe safety • Clean tools, equipment and work place • Store tools		Principles: Students should explain the principles of: • Maintaining general hand tools Theories: Students should explain:- • Function of different types of hand tools • Importance of service manuals in preventive maintenance of tools Circumstantial knowledge Detailed knowledge about: • Safety precautions while handling basic tools • Safe handling of work tools and equipment • Waste disposal procedures	manual • Preventive maintenance schedule • Gloves • Safety boot • Safety clear glasses • Air compressor	
		(c) Maintaining engine and engine accessory	Brainstorm Guide students to define, identify engine accessory	Students should be able to: • Use service	Engine and engine accessory	Knowledge evidence: Detailed knowledge of: Method used:	The following tools, equipment and safety gears are to be	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Num ber of Perio ds per Unit
				Process Assessment	Product/S ervices Assessme nt	Knowledge Assessment		
		tools	tools Practical work Guide students on how to maintain engine and engine accessory tools Activity Organize students in manageable group to maintain engine and engine accessory tools	manual - Select tools and equipment - Interpret service manuals for different tools - Select tools, equipment and materials - Identify fault tools - Perform greasing - Perform online - Observe safety - Clean tools, equipment and work place - Store tools	tools maintained as per required standard	Students should explain how to: - Service engine and engine accessory tools - Stores engine and engine accessory tools Principles: Students should explain the principles of: - Preventing engine and engine accessory tools - Stores engine and engine accessory tools Theories: Students should explain:- - Function of different engine and engine accessory tools - Importance of preventive maintenance of tools Circumstantial knowledge Detailed knowledge about:	available: - Basic tools - Oil can - Service manual - Preventive maintenance schedule - Gloves - Safety boot - Safety clear glasses - Air compressor	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						• Safety precautions while handling basic tools • Safe handling of work tools and equipment • Waste disposal procedures		
		(d) Maintaining tire, wheel, hub, and brake tools	Brainstorm Guide students to define terms, identify tire, wheel, hub and brake tools Practical work Guide students on how to handle tools, equipment and machines Activity Organize students in manageable group to maintain tire, wheel, hub and brake tools	Students should be able to: • Use service manual • Select tools and equipment • Interpret service manuals for different tools • Select tools, equipment and materials • Check functionality of tire, wheel, hub and	Tire, wheel, hub and brake tools maintained as per required standard	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Service tire, wheel, hub and brake tools Principles: Students should explain the principles of: • Preventing tire, wheel, hub and brake tools • Storing tire, wheel, hub and brake tools Theories: Students should explain:- • Function of different types of tire, wheel, hub and	The following tools, equipment and safety gears are to be available: • Basic tools • Oil can • Service manual • Preventive maintenance schedule • Gloves • Safety boot • Safety clear glasses • Air compressor	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				brake tools - Identify fault tools - Perform greasing - Observe safety - Clean tools, equipment and work place - Store tools		brake tools Circumstantial knowledge Detailed knowledge about: - Safety precautions while handling basic tools - Safe handling of work tools and equipment - Waste disposal procedures		
		(e) Maintaining electrical circuit and light system	Brainstorm Guide students to define, identify electrical circuit and light system Practical work Guide students on how to maintain electrical circuit and light system Activity Organize students in manageable group to maintain electrical circuit and light system	Students should be able to: - Use service manual - Select tools and equipment - Interpret service manuals for different tools - Select tools, equipment and materials	electrical circuit and light system maintained as per required standard	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Maintain electrical circuit and light system - Stores basic tools Principles: Students should explain the principles of: - Preventing electrical circuit and light system - Storing electrical circuit and light	The following tools, equipment and safety gears are to be available: - Basic tools - Oil can - Service manual - Preventive maintenance schedule - Gloves - Safety boot - 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	Num ber of Perio ds per Unit
				Process Assessment	Product/S ervices Assessme nt	Knowledge Assessment		
				- Check functionality electrical circuit and light system - Identify fault tools - Observe safety - Clean tools, equipment and work place - Store tools		system Theories: Students should explain:- - Function of different types of electrical circuit and light system - Importance of service manuals in preventive maintenance of tools Circumstantial knowledge Detailed knowledge about: - Safety precautions while handling basic tools - Safe handling of work tools and equipment - Waste disposal procedures		
	2.2 Maintaining machine	(a) Maintaining manual machines	Brainstorm Guide students to define terms, identify manual machines Practical work	Students should be able to: - Interpret machine manual. - Prepare	Manual machines and equipment conform to manufacture	Knowledge evidence: Detailed knowledge of: Method used: Students should explain different ways of maintaining manual	The following tools, safety gears, equipment are to be available:- - Manual machine. - Basic 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	Product/Services Assessment	Knowledge Assessment		
			Guide students on how to maintain manual machines Activity Organize students in manageable group to maintain manual machines	maintenance schedule. • Clean working place. • Dusting off machines.	re specifications.	machine/equipment. Principles: Students should explain the principle of performing maintenance to manual machines. Theories: Students should explain: • Importance of maintaining manual machines • The role of lubricants in manual machines. Circumstantial knowledge Detailed knowledge about: • Safety aspect related to machine maintenance. • Environmental issues.	• Oil can • Service manual • Preventive maintenance schedule • Gloves • Safety boot • Safety clear glasses	
		(b) Maintaining power machines.	Brainstorm Guide students to define, identify power machines Practical work Guide students on how to handle tools,	Students should be able to: • Interpret machine manual. • Prepare maintenance	All maintained machines and equipment conform to	Knowledge evidence: Detailed knowledge of: Method used: Students should explain different ways of maintaining machine/equipment.	The following tools, safety gears, equipment are to be available: • Powered machine • Basic tools • Oil can	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			equipment and machines safely Activity Organize students in manageable group to maintain power machines	e schedule. • Detect machine faults. • Oil machine. • Grease machine. • Sharpen cutting tools. • Perform greasing.	manufacture specifications.	Principles: Students should explain the principle of performing maintenance to machines. Theories: Students should explain: • Parts of machines and their maintenance. • The role of lubricants in machines. Circumstantial knowledge Detailed knowledge about: • Safety aspect related to machine maintenance. • Environmental issues.	• Service manual • Preventive maintenance schedule • Gloves • Safety boot • Safety clear glasses	
3.0. Performing bench works	3.1 Performing Cutting	(a) Performing straight sawing.	Brainstorm Guide students to define terms, identify tools used to perform straight sawing Practical work	Students should be able to: • Interpret technical drawings. • Select tools and	Straight sawing performed as per technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to cut work piece in different sizes. Principles: Students	The following tools, equipment and safety gears are to be available: • Work bench. • Steel rule. • Scriber.	46

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Guide students on how to perform straight sawing Activity Organize students in manageable group to perform straight sawing	equipment • Perform straight sawing. • Observe safety precautions • Clean tools, work piece and work place. • Store tools, equipment and workplace.		should explain the principles of: Performing straight sawing. Theories: Students should explain: • Different types of materials and their properties. • Application of different materials. • Uses of cutting tools and equipment. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while performing cutting process. • Safe handling of work tools and equipment. • Waste disposal.	• T-Square. • Vernier caliper. • Divider. • Micrometer. • Mallet. • Surface table/plate. • Ball pein hammer. • Anvil. • Vernier height gauge. • Chisels. • File. • Hand shear. • Shearing machine. • Centre punch. • Hacksaw. • Power hacksaw. • Safety clear glasses. • Gloves. • Safety boots. • Overall.	
		(b) Performing angular sawing	Brainstorm Guide students to define terms,	Students should be able to:	Angular sawing performed	Knowledge evidence: Detailed knowledge of:	The following tools, equipment and safety gears	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Num ber of Peri ods per Unit
				Process Assessment	Product/S ervices Assessme nt	Knowledge Assessment		
			perform angular sawing Practical work Guide students on how to perform angular sawing Activity Organize students in manageable group to perform angular sawing	• Interpret technical drawings. • Select tools and equipment. • Take measurements. • Cut work piece. • Check for accuracy. • Observe safety precautions • Clean tools, work piece and work place. • Store tools, equipment and workplace.	as per technical specifications.	Method used: Students should explain how to cut work piece in different sizes. Principles: Students should explain the principles of: • Taking measurements. • Marking work piece. • Cutting process. Theories: Students should explain: • Different types of materials and their properties. • Application of different materials. • Uses of cutting tools and equipment. • Use of measuring tools. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while performing cutting process.	are to be available: • Work bench. • Steel rule. • Scriber. • T-Square. • Vernier caliper. • Divider. • Micrometer. • Mallet. • Surface table/plate. • Ball pein hammer. • Anvil. • Vernier height gauge. • Hand shear. • Shearing machine. • Centre punch. • Hacksaw. • Power hacksaw. • Safety clear glasses. • Gloves. • Safety boots. • Overall.	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						- Safe handling of work tools and equipment. - Waste disposal.		
		(c) Performing chiselling	Demonstration Guide students to define, identify procedures for performing chiselling Practical work Guide students on how to perform chiselling Activity Organize students in manageable group to perform chiselling	Students should be able to: - Interpret technical drawings. - Select tools and equipment - Take measurements. - Cut work piece. - Check for accuracy. - Observe safety precautions - Clean tools, work piece and work place. - Store tools, equipment and workplace.	Chiselling performed as per technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to cut work piece in different sizes. Principles: Students should explain the principles of: - Taking measurements. - Marking work piece. - Cutting process. Theories: Students should explain: - Uses of cutting tools and equipment. - Use of measuring tools. Circumstantial knowledge: Detailed knowledge about: - Safety precautions	The following tools, equipment and safety gears are to be available: - Work bench. - Steel rule. - Scriber. - T-Square. - Vernier caliper. - Divider. - Micrometer. - Mallet. - Surface table/plate. - Ball peen hammer. - Anvil. - Vernier height gauge. - Chisels. - File. - Hand shear. - Shearing machine.	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Num ber of Perio ds per Unit
				Process Assessment	Product/S ervices Assessme nt	Knowledge Assessment		
						while performing cutting process. • Safe handling of work tools and equipment. • Waste disposal.	• 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 terms, identify procedures for performing filing Practical work Guide students on how to perform flat filing Activity Organize students in manageable group to perform flat filing	Students should be able to: • Interpret technical drawings. • Select tools and equipment • Take measurements and marking • File work piece • Grind work piece. • Check for accuracy • Observe safety precautions	Flat filing performed conforms to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Mark work piece. • File work piece. • Grind work piece. Principles: Students should explain the principles of: • Taking measurements. • Marking work piece. • Filing and grinding work piece. Theories: Students should: • Identify different types of materials and their	The following tools, equipment and safety gears are to be available: • Work bench. • Set of files. • File card • Try square. • Steel rule • Centre punch • Scriber • Grinder • Divider • Hacksaw • Overall • Gloves. • Safety clear glasses. • Safety boots.	46

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				- Clean tools, work piece and work place. - Store tools, equipment and work piece.		properties. - Explain applications of different materials. - Describe proper use of files and equipment. Circumstantial knowledge: Detailed knowledge about: - Safety precautions pertaining to filling/grinding. - Safe handling of working tools and equipment. - Waste disposal.		
		(b) Perform radii filing.	Demonstration Lead students to define terms, identify procedures for performing radii filing Practical work Guide students on how to perform radii filing Activity	Students should be able to: - Interpret technical drawings. - Select tools and equipment - Take measurements and marking.	Radii filing performed conforms to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Mark work piece. - File work piece. - Grind work piece. Principles: Students should explain the principles of: - Taking measurements.	The following tools, equipment and safety gears are to be available: - Work bench. - Set of files. - File card - Try square. - Steel rule. - Centre punch. - Scriber. - Grinder.	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Organize students in manageable group to perform radii filing	- File work piece. - Grind work piece. - Check for accuracy. - Observe safety precautions - Clean tools, work piece and work place. - Store tools, equipment and work piece.		- Marking work piece. Theories: Students should: - Identify different types of materials and their properties. - Explain applications of different materials. Circumstantial knowledge: Detailed knowledge about: - Safety precautions pertaining to filling - Safe handling of working tools and equipment. - Waste disposal.	- Divider. - Hacksaw. - Overall. - Gloves. - Safety clear glasses. - Safety boots.	
		(c) Performing angle filing	Demonstration Lead students to define terms, identify procedures for performing angle filing Practical work Guide students on how to perform	Students should be able to: - Interpret technical drawings. - Select tools and equipment - Take	Filed work piece conforms to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Mark work piece. - File work piece. - Grind work piece. Principles: Students should explain the	The following tools, equipment and safety gears are to be available: - Work bench. - Set of files. - File card - Try square. - Steel rule.	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Num ber of Perio ds per Unit
				Process Assessment	Product/S ervices Assessme nt	Knowledge Assessment		
			angle filing Activity Organize students in manageable group to perform angle filing	measurements and marking. • File work piece. • Grind work piece. • Check for accuracy. • Observe safety precautions • Clean tools, work piece and work place. • Store tools, equipment and work piece.		principles of: • Filing and grinding work piece. Theories: Students should: • Explain procedures for performing angle filing Circumstantial knowledge: Detailed knowledge about: • Safety precautions pertaining to filling/grinding. • Safe handling of working tools and equipment. • Waste disposal.	- Centre punch. - Scriber. - Grinder. - Divider. - Hacksaw. - Overall. - Gloves. - Safety clear glasses. - Safety boots.	
	3.3 Performing drilling	(a) Perform hand drilling on plate	Brainstorm Guide students to define, identify procedures for performing hand drilling on plate Practical work Guide students on how to perform hand drilling on plate	Students should be able to: - Interpret technical drawings. - Select tools, equipment and materials.	Drilled hole conforms to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Perform drilling process. - Calculate drill size and drilling speed. Principles: Students should explain the	The following tools, equipment and safety gears are to be available: - Work bench. - Hand drilling machine. - Centre punch. - Hammer (Ball pain hammer).	46

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Num ber of Perio ds per Unit
				Process Assessment	Product/S ervices Assessme nt	Knowledge Assessment		
			Activity Organize students in manageable group to perform hand drilling on plate	- Mark work piece. - Cut work piece to size. - Perform drilling. - Perform reaming. - Observe safety precautions - Clean tools, equipment and work place. - Store tools, equipment and work piece.		principles of: - Drilling. - Selection of drilling speed. Theories: Students should explain: - Drilling procedures. - Purpose of coolant in drilling process. - Materials used to manufacture drill bits. - Drill bit cutting angles. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while performing drilling. - Safe handling of tools and equipment. - Waste disposal.	- Scriber. - Steel rule. - Try square. - Set of drill bits. - Oil can. - Wire brush. - Vernier calliper. - Calculator. - Safety clear glasses. - Gloves. - Safety boots. - Overalls.	
		(b) Carry out drilling on bench drilling machine	Brainstorm Guide students to describe drilling process	Students should be able to: Interpret technical	Drilled hole conforms to technical	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to:	The following tools, equipment and safety gears are to be available:	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Practical work Guide students on how to carry out drilling on bench drilling machine Activity Organize students in manageable group to carry out drilling on bench drilling machine	drawings. - Select tools, equipment and materials. - Mark work piece. - Cut work piece to size. - Perform drilling. - Observe safety precautions - Clean tools, equipment and work place. - Store tools, equipment and work piece.	specifications.	- Perform drilling process. - Calculate drill size and drilling speed. Principles: Students should explain the principles of: - Drilling. - Selection of drilling speed. Theories: Students should explain: - Drilling procedures. - Purpose of coolant in drilling process. - Materials used to manufacture drill bits. - Drill bit cutting angles. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while performing drilling. - Safe handling of tools and equipment.	- Work bench. - Centre punch. - Hammer (Ball pain hammer). - Scriber. - Steel rule. - Try square. - Set of drill bits. - Bench drilling machine and accessories. - Oil can. - Wire brush. - Vernier calliper. - Calculator. - Safety clear glasses. - Gloves. - 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	Num ber of Perio ds per Unit
				Process Assessment	Product/S ervices Assessme nt	Knowledge Assessment		
						Waste disposal.		
		(c) Counter bore drilled holes.	Discussion Guide students to define terms, identify procedures for counter boring drilled holes Practical work Demonstrate to students on how to Counter bore drilled holes Activity Organize student in manageable group to Counter bore drilled holes.	Students should be able to: - Interpret technical drawings. - Select tools, equipment and materials. - Mark work piece. - Cut work piece to size. - Perform Counter boring drilled holes - Observe safety precautions - Clean tools, equipment and work place. - Store tools,	Drilled hole conforms to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Perform drilling process. - Calculate drill size and drilling speed. Principles: Students should explain the principles of: - Drilling. - Selection of drilling speed. Theories: Students should explain: - Drilling procedures. - Purpose of coolant in drilling process - Drill bit cutting angles. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while performing drilling.	The following tools, equipment and safety gears are to be available: - Work bench. - Hand drilling machine. - Centre punch. - Hammer (Ball pain hammer). - Scriber. - Steel rule. - Try square. - Set of drill bits. - Bench drilling machine and accessories. - Oil can. - Wire brush. - Vernier calliper. - Calculator. - Safety clear glasses. - Gloves. - Safety boots. - Overalls.	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				equipment and work piece.		- Safe handling of tools and equipment. - Waste disposal.		
	3.4 Performing Riveting	(a) Performing manual riveting	Demonstration Lead students to describe concept of manual riveting Practical work Guide students on how to perform manual riveting Activity Organize students in manageable group to perform manual riveting	Students should be able to: - Interpret technical drawings. - Select tools, equipment and materials. - Mark work piece. - Cut work pieces. - Drill holes. - Perform riveting. - Observe	Riveted pieces conform to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Mark work pieces. - Cut work pieces in different sizes. - Calculate drilling speed. - Drill holes. Principles: Students should explain the principles of: - Taking measurements. - Marking work piece. - Riveting pieces of	The following tools, equipment and safety gears are to be available: - Riveting machine and accessories. - Steel rule. - Wire brush. - T-Square. - Centre punch. - Rivet gun. - Piece of wood. - Divider. - Soft hammer. - Ball peen hammer - Air	46

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				safety precautions • Clean tools, equipment, work piece and work place. • Store tools, equipment and work piece.		metals. Theories: Students should explain: • Types of joints. • Types of rivets. • Application of different materials in riveting. • Use of cutting tools and equipment. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while performing riveting. • Safe handling of work tools, equipment and work pieces. • Waste disposal.	compressor. Rivert head forming tools. • Data book. • Anvil. • Work bench. • Pliers. • Vice grip. • Helmet. • Goggles. • Gloves. • Safety boot. • Overall.	
		(a) Performing pop riveting	Brainstorm Guide students to define, identify procedures for performing pop riveting Practical work Guide student on	Students should be able to: • Interpret technical drawings. • Select tools, equipment	Riveted pieces conform to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • perform pop riveting Principles: Students should explain the	The following tools, equipment and safety gears are to be available: • Riveting machine and accessories. • Steel rule.	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			how to perform pop riveting Activity Organize students in manageable group to perform pop riveting	and materials. • Mark work piece. • Cut work pieces. • Perform riveting. • Observe safety precautions • Clean tools, equipment, work piece and work place. • Store tools, equipment and work piece.		principles of: • performing pop riveting Students should explain • Application of different materials in riveting. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while performing riveting. • Safe handling of work tools, equipment and work pieces. • Waste disposal.	• Wire brush. • T-Square. • Centre punch. • Rivet gun. • Divider. • Rivert head forming tools. • Data book. • Anvil. • Work bench. • Pliers. • Vice grip. • Helmet. • Goggles. • Gloves. • Safety boot. • Overall.	
		(b) Performing pneumatic riveting	Discussion Guide students to describe pneumatic riveting Practical work Guide students on how to perform pneumatic riveting	Students should be able to: • Interpret technical drawings. • Select tools, equipment	Riveted pieces conform to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Perform pneumatic riveting. Principles: Students should explain the	The following tools, equipment and safety gears are to be available: • Riveting machine and accessories. • Steel rule.	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Num ber of Perio ds per Unit
				Process Assessment	Product/S ervices Assessme nt	Knowledge Assessment		
			Activity Organize students in manageable group to perform pneumatic riveting.	and materials. - Mark work piece. - Cut work pieces. - Perform pneumatic riveting. - Observe safety precautions - Clean tools, equipment, work piece and work place. - Store tools, equipment and work piece.		principles of: - Performing pneumatic riveting. Theories: Students should explain - Procedures for performing pneumatic riveting. - Application of different materials in riveting. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while performing riveting. - Safe handling of work tools, equipment and work pieces. - Waste disposal.	- Wire brush. - T-Square. - Centre punch. - Set of drill bits. - Rivet gun. - Divider. - Rivert head forming tools. - Data book. - Anvil. - Work bench. - Pliers. - Vice grip. - Helmet. - Goggles. - Gloves. - Safety boot. - Overall.	
	3.5 Performing thread cutting	(a) Carrying out dieing	Brainstorm Guide students to define terms, identify function of die material Practical work Guide students on	Students should be able to: - Interpret technical drawings. - Select tools,	Dieing carried out conform to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: procedures for performing dieing Principles: Students	The following tools, equipment and safety gears are to be available: Set of taps and stock wrenches.	40

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			how to perform dieing Activity Organize students in manageable group to perform dieing	equipment and materials. • Mark work piece. • Observe safety precautions • Carry out dieing • Clean tools, equipment, work piece and work place. • Store tools, equipment and work piece.		should explain the principles of: • Carrying out dieng. Theories: Students should explain: • The function of dies. • Types of dies. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while cutting threads. • Safe handling of tools, equipment and materials. • Waste disposal.	• Set of dies and stock wrenches. • Work bench. • Wire brush. • Oil can. • Scriber. • Steel rule. • Micrometers. • Thread gauges. • Vernier caliper. • Centre punch. • Thread data manual. • Gloves. • Goggles. • Safety boots. • Overalls.	
		(b) Carrying out taping	Demonstration Guide students to define, identify classification of taps Practical work Guide students on how to carry out taping	Students should be able to: • Interpret technical drawings. • Select tools, equipment and	Taping carried out conform to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Cut external threads. • Cut internal threads. Principles: Students	The following tools, equipment and safety gears are to be available: • Set of taps and stock wrenches. • Set of dies and	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Activity Organize students in manageable group to Carry out tapping	materials. - Mark work piece - Carry out tapping - Observe safety precautions - Clean tools, equipment, work piece and work place. - Store tools, equipment and work piece.		should explain the principles of: - Carry out tapping - Selecting thread pitch. - Calculating hole diameter. Theories: Students should explain: - The function of taps. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while cutting threads. - Safe handling of tools, equipment and materials. - Waste disposal.	stock wrenches. - Work bench. - Wire brush. - Set of drill bits. - Oil can. - Scriber. - Steel rule. - Micrometers. - Drilling machine. - Hacksaw. - Thread gauges. - Vernier calliper. - Centre drill. - Centre punch. - Thread data manual. - Gloves. - Goggles. - Safety boots. - Overalls.	
	3.6 Performing Metal Forming	(c) Bending flat materials.	Demonstration Demonstrate to students on how to bend flat materials	Students should be able to: Interpret technical	Work piece formed conforms to	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to:	The following tools, equipment and safety gears are to be available:	40

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Practical work Guide students on how to bend flat materials Activity Organize students in manageable group to perform bending flat materials.	drawing. - Select required work piece. - Prepare required tools and equipment for bending. - Mark work piece. - Clamp work piece on bench vice. - Bend work piece. - Observe safety precautions - Clean tools, equipment, work pieces and work place. - Store tools, equipment and remained	technical specifications.	- Form work pieces in different shapes. Principles: Students should explain the principles of: - Forming process. Theories: Students should explain: - Types of machines and equipment used for metal forming - Calculations required. - Uses of various tools and equipment. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while forming metal. - Safe handling of tools and equipment. - Waste disposal.	- Work bench. - Bench vice. - Try square. - Vernier calliper. - Steel rule. - Spring divider. - Scriber. - Anvil. - Centre punch. - Hammer. - Radius gauges. - Bending machine. - Leather gloves. - Overall. - Safety boots. - Safety glasses.	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				material.				
		(d) Bending round materials	Brainstorm Guide students to define, identify types of machine and equipment for bending round materials Practical work Guide students on how to bend round material Activity Organize students in manageable group to bend round materials	Students should be able to: • Interpret technical drawing. • Select required work piece. • Prepare required tools and equipment for bending. • Mark work piece. • Clamp work piece on bench vice. • Bend work piece. • Observe safety precautions • Clean tools, equipment, work	Work piece formed conforms to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Form work pieces in different shapes. • Take measurements. • Read scales. Principles: Students should explain the principles of: • Bend round materials Theories: Students should explain: • Types of machines and equipment used for bending round materials • Features of bending machines Circumstantial knowledge: Detailed knowledge about: • Safety precautions while bending round materials.	The following tools, equipment and safety gears are to be available: • Work bench. • Bench vice. • Try square. • Vernier calliper. • Steel rule. • Hacksaw. • Level protractor. • Spring divider. • Scriber. • Anvil. • Centre punch. • Hammer. • Radius gauges. • Bending machine. • Leather gloves. • Overall. • Safety boots. • Safety glasses.	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				pieces and work place. • Store tools, equipment and remained material.		- Safe handling of tools and equipment. - Waste disposal.		
4.0 performing welding processes	4.1 Performing arc welding	(a) Performing down hand arc welding bead.	Demonstration Demonstrate to students on how to perform down hand arc welding bead. Practical work Guide students to perform down hand welding machines Activity Organize students in manageable group to perform down hand welding bead	Students should be able to: - Interpret technical drawings. - Select tools, equipment and materials. - Mark work piece. - Cut or grind work piece. - Select welding current. - Weld work piece. - Remove slag - Observe	Down hand arc welding bead Conforms to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Prepare work piece. - Weld different types of joints and sizes. Principles: Students should explain the principles of: - Welding process. Theories: Students should explain: - Types of welding. - Types of electrodes. - Properties of materials. - Application of AC and DC arc welding machines.	The following tools, equipment and safety gears are to be available: - AC/DC arc welding machine. - Chipping hammer. - Welding bench. - Clamp. - Hand hacksaw. - Shearing machine. - Wire brush. - Scriber. - Centre punch. - Steel rule. - Ball peen hammer. - Set of files.	69

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				safety precautions • Clean tools, equipment, work piece, and work place. • Store tools and equipment.		• Components parts of arc welding machines Circumstantial knowledge: Detailed knowledge about: • Safety precautions while performing arc welding. • Safe handling of work tools, equipment and materials. • Waste disposal.	• Try square. • Grinding machine. • Anvil. • Welding shield. • Leather apron. • Tong. • Power hacksaw. • Gloves. • Safety boots. • Overall. • Safety clear glasses.	
		(b) Performing down hand V joint	Discussion Guide students to define terms, identify types of joints Practical work Guide students on how to perform down hand V joint Activity Organize students in manageable group to perform down hand V joint	Students should be able to: • Interpret technical drawings. • Select tools, equipment and materials. • Mark work piece. • Cut or grind work piece.	Down hand V joint performed conforms to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Perform down hand V joint Principles: Students should explain the principles of : Performing down hand V joint Theories: Students should explain: • Properties of materials.	The following tools, equipment and safety gears are to be available: • AC/DC arc welding machine. • Chipping hammer. • Welding bench. • Clamp. • Hand hacksaw. • Shearing	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				- Select welding current. - Perform down hand tee joint welding slag - Observe safety precautions - Clean tools, equipment, work piece, and work place - Store tools and equipment.		- Application of AC and DC arc welding machines. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while performing arc welding. - Safe handling of work tools, equipment and materials. - Waste disposal.	machine. - Wire brush. - Scriber. - Centre punch. - Steel rule. - Ball pein hammer. - Set of files. - Try square. - Grinding machine. - Anvil. - Welding shield. - Leather apron. - Tong. - Power hacksaw. - Gloves. - Safety boots. - Overall. - Safety clear glasses.	
		(c) Perform down hand butt joint	Brainstorm Guide students to define, identify types of joints Practical work Guide students on how to perform	Students should be able to: - Interpret technical drawings. - Select	Down hand butt joint performed conforms to technical specificati	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: Prepare work piece.	The following tools, equipment and safety gears are to be available: AC/DC arc welding	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			down hand tee joint welding Activity Organize students in manageable group to Perform down hand butt joint	tools, equipment and materials. • Mark work piece. • Cut or grind work piece. • Select welding current. • Perform down hand butt joint • Remove slag • Observe safety precautions • Clean tools, equipment, work piece, and work place. • Store tools and equipment.	ons.	• Perform down hand V joint Principles: Students should explain the principles of: • Perform down hand tee joint welding. Theories: Students should explain: • Properties of materials. • Procedures for performing down hand butt joint Circumstantial knowledge: Detailed knowledge about: • Safety precautions while performing arc welding. • Safe handling of work tools, equipment and materials. • Waste disposal.	machine. • Chipping hammer. • Welding bench. • Clamp. • Hand hacksaw. • Shearing machine. • Wire brush. • Scriber. • Centre punch. • Steel rule. • Ball pein hammer. • Set of files. • Try square. • Grinding machine. • Anvil. • File • Welding shield. • Leather apron. • Tong. • Power hacksaw. • Gloves. • Safety boots.	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
							- Overall. - Safety clear glasses.	
		(d) Performing down hand tee joint welding.	Question and answer Guide students to describe concept of down hand tee joint welding Practical work Guide students on how to perform down hand tee joint welding Activity Organize students in manageable group to perform down hand tee joint welding	Students should be able to: - Interpret technical drawings. - Select tools, equipment and materials. - Mark work piece. - Cut or grind work piece. - Select welding current. - Perform down hand tee joint welding. - Remove slag - Observe safety precautions	Down hand V joint performed conforms to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Prepare work piece. - Perform down hand tee joint welding Principles: Students should explain the principles of: - Performing down hand tee joint welding Theories: Students should explain: - Properties of materials. - Application of AC and DC arc welding machines. - Procedures for Performing down hand tee joint welding. Circumstantial knowledge:	The following tools, equipment and safety gears are to be available: - AC/DC arc welding machine. - Chipping hammer. - Welding bench. - Clamp. - Hand hacksaw. - Shearing machine. - Wire brush. - Scriber. - Centre punch. - Steel rule. - Ball pein hammer. - Set of files. - Try square. - Grinding machine. - Anvil.	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				- Clean tools, equipment, work piece, and work place. - Store tools and equipment.		Detailed knowledge about: - Safety precautions while performing down hand tee joint welding. - Safe handling of work tools, equipment and materials. - Waste disposal.	- Welding shield. - Leather apron. - Tong. - Power hacksaw. - Gloves. - Safety boots. - Overall. - Safety clear glasses.	
	4.2 Performing Gas Welding	(a) Use gas welding tools and equipment.	Discussion Guide students to identify gas welding tools and functions of each Demonstration Demonstrate to students each gas welding tools and equipment and how to use each gas welding tools and equipment Activity Organize students in manageable group to identify tools for gas welding and their	Students should be able to: - Select tools, equipment and materials. - Identify gas welding tools and equipment - Demonstrate parts and function of each gas welding tools and equipment - Install gas	Gas welding tools and equipment conforms to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Procedures for using gas welding equipment Principles: Students should explain the principles of gas welding. Theories: Students should explain: - Types of gas welded materials. - Use of tools and gas welding equipment.	The following tools, equipment and safety gears are to be available: - Oxy-acetylene gas cylinders and accessories. - Hammer. - Pair of tongs. - Wire brush. - Chisel. - Shearing machine. - Oxy-acetylene welding bench. - Oxy-acetylene welding bay.	70

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			functions and practice the use of each tool	welding equipment • Test for leakage • Adjust the welding flame. • Observe safety precautions • Demonstrate different types of flame • Clean tools, equipment, work piece and work place. • Store tools and equipment.		• Properties of oxygen and acetylene gas. • Types of gas welded joints. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while performing gas welding. • Safe handling of work tools, equipment and work pieces. • Waste disposal.	• Clamp. • Hacksaw. • Scriber. • Steel rule. • Grinding machine. • Cylinder trolley. • Helmet. • Safety boots. • Overall. • Gloves. • Leather apron. • Gas welding goggles.	
		(b) Performing gas welding on metals.	Brainstorm Guide students to define terms, Identify functions of gas welding Practical work Guide students on	Students should be able to: • Interpret technical drawings. • Select tools,	Gas Welded work piece conforms to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Perform gas welding on metals Principles: Students	The following tools, equipment and safety gears are to be available: • Oxy-acetylene gas cylinders and	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			how to perform gas welding on metals Activity Organize students in manageable group to perform gas welding on metals	equipment and materials • Take measurements • Prepare work piece for welding • Adjust the welding flame. • Carry out gas welding. • Observe safety precautions • Clean tools, equipment, work piece and work place • Store tools and equipment.	ons.	should explain the principles of gas welding. Theories: Students should explain: • Importance of gas welding. • Types of gas welding joints Circumstantial knowledge: Detailed knowledge about: • Safety precautions while performing gas welding. • Safe handling of work tools, equipment and work pieces. • Waste disposal.	accessories. • Hammer. • Pair of tongs. • Wire brush. • Chisel. • Shearing machine. • Oxy-acetylene welding bench. • Oxy-acetylene welding bay. • Clamp. • Hacksaw. • Scriber. • Steel rule. • Grinding machine. • Cylinder trolley. • Helmet. • Safety boots. • Overall. • Gloves. • Leather apron. • Gas welding goggles.	
		(c) Performing gas metal cutting	Brainstorm Guide students to define terms,	Students should be able to:	Gas metal cutting. Conforms	Knowledge evidence: Detailed knowledge of:	The following tools, equipment and safety gears	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			identify cutting electrodes Demonstration Demonstrate to students on how to perform gas metal cutting Activity Organize students in manageable group to perform gas metal cutting	• Interpret technical drawings. • Select tools, equipment and materials. • Take measurements. • Adjust the cutting flame • Perform gas metal cutting. • Observe safety precautions • Clean tools, equipment, work piece and work place. • Store tools and equipment.	to technical specifications.	Method used: Students should explain how to: • Perform gas metal cutting Principles: Students should explain the principles of gas metal cutting. Theories: Students should explain: • procedures Perform gas metal cutting Circumstantial knowledge: Detailed knowledge about: • Safety precautions while performing gas metal cutting. • Safe handling of work tools, equipment and work pieces. • Waste disposal.	are to be available: • Oxy-acetylene gas cylinders and accessories. • Hammer. • Pair of tongs. • Wire brush. • Chisel. • Shearing machine. • Oxy-acetylene welding bench. • Oxy-acetylene welding bay. • Clamp. • Hacksaw. • Scriber. • Steel rule. • Grinding machine. • Cylinder trolley. • Helmet. • Safety boots. • Overall. • Gloves. • Leather apron.	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
							Gas welding goggles.	
		(d) Performing brazing	Demonstration Demonstrate to students on how perform brazing Practical work Guide students on performing brazing Activity Organize students in manageable group to perform brazing	Students should be able to: - Interpret technical drawings. - Select tools, equipment and materials. - Take measurements. - Carry out brazing - Observe safety precautions - Clean tools, equipment, work piece and work place. - Store tools and equipment.	Brazing performed conforms to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Perform brazing. Principles: Students should explain the principles of Performing brazing Theories: Students should explain: - Brazing materials - Procedures for Performing brazing Circumstantial knowledge: Detailed knowledge about: - Safety precautions while performing brazing. - Safe handling of work tools, equipment and work pieces. - Waste disposal.	The following tools, equipment and safety gears are to be available: - Oxy-acetylene gas cylinders and accessories. - Hammer. - Pair of tongs. - Wire brush. - Chisel. - Shearing machine. - Oxy-acetylene welding bench. - Oxy-acetylene welding bay. - Clamp. - Hacksaw. - Scriber. - Steel rule. - Grinding machine. - Cylinder trolley. - Helmet.	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
							• Safety boots. • Overall. • Gloves. • Leather apron. • Gas welding goggles.	
	4.3 Performing Soldering	(a) Carrying out thin metal soldering	Brainstorm Guide students to define terms, identify soldering materials Practical work Guide students on how to perform thin metal soldering Activity Organize students in manageable group to Carry out thin metal soldering	Students should be able to: • Select tools, equipment and material. • Prepare parts to be soldered. • Carry out thin metal soldering. • Observe safety precautions • Clean tools, equipment, work piece and work place. • Store tools, equipment	Soldered joint conforms to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Perform soldering process. Principles: Students should explain the principles of soldering. Theories: Students should explain: • Soldering process. • Properties of brazing materials • Importance of soldering flux. • Tools used in soldering process. • Importance of cleaning parts to be soldered. Circumstantial knowledge: Detailed knowledge	The following tools, equipment and safety gears are to be available: • Soldering gun • Charcoal stove/blow lamp. • Wire brush. • Work bench. • Test hammer. • Spark lighter. • Combination plier. • Pair of tongs. • Wire stripper. • Tin snip. • Gloves. • Safety clear glasses. • Overall. • Safety boots.	21

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Num ber of Perio ds per Unit
				Process Assessment	Product/S ervices Assessme nt	Knowledge Assessment		
				and work piece.		about: • Safety precautions while soldering. • Safe handling of tools, equipment and work piece. • Waste disposal.		
5.0 carrying out general maintenance on electrical systems	5.1 Building Simple Electric Circuits	(a) Constructing simple electric circuits	Brainstorm Guide students to define, identify tools for Constructing simple electric circuits Practical work Guide students on how to Construct simple electric circuits Activity Organize students in manageable group to Construct simple electric circuits	Students should be able to: • Select appropriate tools • Observe safety precautions • Observe procedures for constructing various circuits • Determine component values. • Constructing simple series circuits • Constructing simple	Simple electric circuits constructed as per given electric drawing and configuration.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Construct simple series circuits • Construct simple parallel circuits • Construct simple combination circuits. Principles: Students should explain principle of: • Determining various quantities Theories: Students should explain: the functioning and testing different types of: • Ohm's law. • Different component ratings.	The following tools, equipment and safety gears are to be available: • vehicle • Safety boots • Safety glasses • Safety gloves • Helmet • Reflective vest • Tool kits • Work bench. • Electronics board. • Electric board • Measuring tape. • Analogue and digital multimeters. • Grease gun • Wire brush	50

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Num ber of Perio ds per Unit
				Process Assessment	Product/S ervices Assessme nt	Knowledge Assessment		
				parallel circuits - Constructing simple combination circuits. - Perform soldering. - Observe safety precautions - Clean tools, equipment and work place. - Store tools and equipment.		- Types of electric circuit connections. - Verification of electric rules and laws. Circumstantial knowledge: Detailed knowledge about: - Safe handling of work tools.		
		(b) Measuring electrical quantities	Discussion Guide students to define, identify tools for measuring electrical quantities Demonstration Guide students on how to measure electrical quantities Practical	Students should be able to: - Select appropriate tools - Observe safety precautions - Observe procedures for	Electric quantities measured as per given electric configuration.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Measure components values. - Measure values of voltage and current in circuit - Measure components values.	The following tools, equipment and safety gears are to be available: - vehicle - Safety boots - Safety glasses - Safety gloves - Helmet - Reflective vest - Tool kits	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Organize students in manageable group to Measure electrical quantities	Measuring electric circuits • Measure electric quantities. • Observe safety precautions • Clean tools, equipment and work place. • Store tools and equipment.		• Measure electric quantities. • Measuring voltage in the circuit. • Measuring current in the circuit. • Measuring resistance in the circuit Principles: Students should explain principle of: • Measuring various electrical quantities. Theories: Students should explain: the functioning and testing different types of: • Types and uses of measuring equipment. • Application of color codes • Ohm's law. • Types of electric circuit connections. • Measurement of voltage in the circuit. • Measurement of	• Work bench. • Electronics board. • Electric board • Measuring tape. • Analogue and digital multimeters. • Grease gun • Wire brush	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						current in the circuit. - Measurement of resistance in the circuit Verification of electric rules and laws. - Types and uses of measuring equipment. Circumstantial knowledge: Detailed knowledge about: - Safe handling of work tools. - Safe handling of measuring instruments		
	5.2 Performing general maintenance on electrical systems	(a) Performing battery maintenance	Discussion Guide students to define terms, identify functions of battery Demonstration Demonstrate to students on how to dismount battery from the vehicle	Students should be able to: - Select tools and equipment - Determine component values. - Measure electric quantities.	Battery maintenance performed conform to technical standard.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Perform battery maintenance Principles: Students should explain the principles of: - Battery	The following tools, equipment and safety gears are to be available: - Electrical components. - Analog and digital Multimeters. - Tool kit. - Work bench.	200

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Activity Organize students in manageable group to perform battery maintenance	- Measuring voltage in the battery. - Measuring current in the battery. - Measuring resistance in the battery. - Measuring electrical power in the circuit - Remove battery from vehicle. - Check battery state of charge. - Service battery. - Mount battery to vehicle. - Test battery. - Observe safety		construction. - Performing battery maintenance. Theories: Students should explain: - Function of batteries. - Types of batteries. - Electrolysis process. - Preparation of electrolyte. - Handling of batteries - Procedures for mounting and dismounting battery from vehicle Circumstantial knowledge: Detailed knowledge about: - Safe handling of work tools. - Safe handling of measuring instruments.	- Work bench light. - Power supply. - Safety boots. - Safety gloves. - Overall. - Battery charger. - Hydrometer. - High rate discharge tester. - Wire brush. - Vehicle. - Set of different wire connectors. - Service manual.	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				precautions • Clean tools, equipment and work place. Store tools and equipment				
		(b) Servicing electrical circuits	Discussion Guide students to define terms, identify components of electrical circuit Practical work Guide students on how to service electrical circuits Activity Organize students in manageable group to service electrical circuits	Students should be able to: • Select tools and equipment • Interpret electrical circuit diagrams. • Diagnoses electrical circuit faults. • Service electrical circuits • Test electrical circuit • Observe safety	electrical circuit serviced Conform to standard values.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Trace faults in electrical circuits. • Interpret electrical quantities. Principles: Students should explain the principles of: • Servicing electrical circuits Theories: Students should explain: • Functions of different electrical components. • Application of ohm's law. • Possible faults in	The following tools, equipment and safety gears are to be available: • Electrical components. • Analog and digital Multimeters. • Tool kit. • Work bench. • Work bench light. • Power supply. • Safety boots. • Safety gloves. • Overall. • Vehicle. • Hydrometer. • High rate discharge	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				precautions Clean tools, equipment and work place. Store tools and equipment		electrical circuits cause and remedies Circumstantial knowledge: Detailed knowledge about: - Safe handling of work tools. - Safety precautions while servicing electrical circuit	tester. - Wire brush. - Tool kit. - Multimeter. - Set of different wire connectors. - Tester. - Wire stripper	
		(c) Servicing conventional ignition systems	Brainstorm Guide students to define, identify conventional ignition systems Practical work Guide students on how to service conventional ignition systems Activity Organize students in manageable group to service conventional ignition systems	Students should be able to: - Select tools and equipment - Interpret diagrams. - Diagnose faults in ignition system circuit. - Rectify defective components. - Test ignition system	Conventional ignition systems serviced conform to technical specification.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Service conventional ignition systems - Use service manual Principles: Students should explain the principles of: - Servicing ignition system components. - Operation of ignition system Theories: Students should explain: - Types of ignition	The following tools, equipment and safety gears are to be available: - Electrical components. - Analog and digital Multimeters. - Tool kit. - Work bench. - Work bench light. - Power supply. - Safety boots. - Safety gloves. - Overall. - Hydrometer. - High rate	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				• Use service manual. • Observe safety precautions • Clean tools, equipment and work place.		systems. • Function of ignition system components. • Importance of Servicing conventional ignition systems Circumstantial knowledge: Detailed knowledge about: • Safe handling of work tools. • Safety precaution while Servicing conventional ignition systems	discharge tester. • Wire brush. • Soldering gun. • Work bench. • AC/DC Generator and starter Motor test bench. • Ignition coil tester. • Ignition coil tester. • Safety clear glasses.	
		(a) Checking lighting system	Brainstorm Guide students to describe lighting circuit Practical work Guide students on how to Check lighting system Activity Organize students in	Students should be able to: • Determine component values. • Select tools and equipment • Use service manual. • Observe	lighting system checked Conform to technical standard.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Check lighting system Principles: Students should explain the principles of: • lighting system Theories: Students	The following tools, equipment and safety gears are to be available: • Electrical components. • Analog and digital Multimeters. • Tool kit. • Work bench.	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Num ber of Perio ds per Unit
				Process Assessment	Product/S ervices Assessme nt	Knowledge Assessment		
			manageable group to Check lighting system	safety precautions • Check lighting system • Clean tools, equipment and work place. Store tools and equipment		should explain: • Types of lighting circuits • Functions of lighting systems • Application of ohm's law. • Headlamp circuit • Turning signal and hazard light circuit • Brake light circuit • Parking light circuit • Reverse light circuit • LED light • decorative light • Possible faults, causes and their remedies of lighting systems. Circumstantial knowledge: Detailed knowledge about: • Safe handling of work tools. • Safety precaution while Checking lighting system	• Work bench light. • Power supply. • Safety boots. • Safety gloves. • Overall. • Vehicle. • Test lamp. • Service manual. • Hydrometer. • Wire brush. • Soldering gun. • Work bench. • AC/DC Generator and starter Motor test bench. • Wire stripper • Safety boots	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
		(b) Servicing accessories circuits and components	Brainstorm Guide students to define terms, Identify accessories circuits and components Practical work Guide students on how to service accessories circuits and components Activity Organize students in manageable group to service accessories circuits and components	Students should be able to: • Determine component values. • Select tools and equipment • Interpret auxiliary circuits diagrams. • Use service manual. • Diagnose auxiliary circuits and components system • Service accessories circuits and components • Troubleshoot auxiliary circuits and components • Observe	Accessories circuits and components conform to technical standard	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Trace faults in auxiliary circuits Principles: Students should explain the principles of: • Operation principle of different auxiliary circuits. Theories: Students should explain: • Functions of different auxiliary circuits. • Construction of different auxiliary circuits • Application of different auxiliary circuits • Testing of different auxiliary circuits • Troubleshoot faults of different auxiliary circuits • Safety precautions of servicing	The following tools, equipment and safety gears are to be available: • Analog and digital Multimeters. • Tool kit. • Work bench. • Work bench light. • Power supply. • Safety boots. • Safety gloves. • Overall. • Vehicle. • Hydrometer. • High rate discharge tester. • Set of different wire connectors. • Service manual. • Soldering gun. • Work bench. • AC/DC Generator and starter Motor	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				safety precautions Clean tools, equipment and work place. Store tools and equipment		different auxiliary circuits Circumstantial knowledge: Detailed knowledge about: - Safe handling of work tools. - Safety precautions while Servicing accessories circuits and components	test bench. Wire stripper	
6.0 carrying out general tractor services	6.1 Servicing Engine Lubrication Systems	(a) Changing engine oil.	Brainstorm Guide students to describe concept of engine oil Practical work Guide students on how to Change engine oil Activity Organize students in manageable group to Change engine oil by following procedures	Students should be able to: - Select tools and equipment - Keep vehicle on level ground/hoist/service pit. - Change engine oil. - Test engine for oil leakage. - Observe safety	Engine oil changed according to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Check oil condition and level. - Change engine oil. - Check for leakage. Principles: Students should explain the principles of servicing engines. Theories: Students should explain: - Types of lubricants. - Importance of engine oil	The following tools, equipment and safety gears are to be available: - Vehicle or stationary engine. - Tool kit. - Filter wrench. - Oil container (waste bin). - Funnel. - Drain plug spanner (SST). - Vehicle hoist/pit. - Service manual.	50

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				precautions • Clean tools, equipment and work place. • Store tools and equipment.		• Oil properties. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while changing engine oil • Safe handling of work tools and equipment. • Waste disposal.	• Covering blanket. • Air compressor. • Gloves. • Overall. • Safety boots.	
		(b) Changing engine oil filter	Brainstorm Guide students to define, identify function of oil filter, analyze procedure for changing engine oil filter Practical work Guide students on how to change engine oil filter Activity Organize students in manageable group to Change engine oil filter	Students should be able to: • Select tools and equipment • Keep vehicle on level ground/hoist/service pit. • Change oil filter. • Test engine for oil leakage. • Observe safety	Engine oil filter changed according to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Check for leakage. • Change engine oil filter Principles: Students should explain the principles of servicing engines. Theories: Students should explain: • Importance of oil filter. • Procedures to Change engine oil filter	The following tools, equipment and safety gears are to be available: • Vehicle or stationary engine. • Tool kit. • Filter wrench. • Oil container (waste bin). • Funnel. • Oil filter • Drain plug spanner (SST). • Vehicle hoist/pit. • Service	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				precautions • Clean tools, equipment and work place. • Store tools and equipment.		Circumstantial knowledge: Detailed knowledge about: • Safety precautions while changing engine oil filter • Safe handling of work tools and equipment. • Waste disposal.	manual. • Covering blanket. • Air compressor. • Gloves. • Overall. • Safety boots.	
	6.2 Servicing fuel systems	(c) Changing fuel filter	Brainstorm Guide students to define, identify function of fuel filter Practical work Guide students on how to change fuel filter Activity Organize students in manageable group to change fuel filter	Students should be able to: • Select tools and equipment • Change fuel filter • Test performance of fuel system. • Observe safety precautions • Clean tools, equipment and work place.	Fuel filter Changed conforms to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Service fuel filter. Principles: Students should explain principles of servicing fuel systems. Theories: Students should explain: • Function of fuel filter • Types of fuel systems. • Importance of changing fuel filter Circumstantial knowledge:	The following tools, equipment and safety gears are to be available: • Vehicle or stationary engine. • Service manual. • Tool kit. • Air Compressor. • Filter wrench (SST). • Fuel filter • Fuel container. • Covering blanket. • Fuel pressure	75

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Num ber of Perio ds per Unit
				Process Assessment	Product/S ervices Assessme nt	Knowledge Assessment		
				Store tools and equipment.		Detailed knowledge about: - Safety precautions while Changing fuel filter - Safe handling of tools, equipment and parts. - Waste disposal.	gauge. - Overall. - Safety boots. - Gloves. - Safety clear glasses.	
		(d) Servicing air cleaner	Brainstorm Guide students to define, identify function of air cleaner Practical work Guide students on how service air cleaner Activity Organize students in manageable group to service air cleaner	Students should be able to: - Select tools and equipment - Service air cleaner. - Observe safety precautions - Clean tools, equipment and work place. - Store tools and equipment.	Serviced air cleaner system conforms to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Service air filter. - Service fuel filter. Principles: Students should explain principles of servicing fuel systems. Theories: Students should explain: - Function of fuel systems and components. - Types of air cleaner - Importance of servicing air cleaner - Use of service	The following tools, equipment and safety gears are to be available: - Vehicle or stationary engine. - Service manual. - Tool kit. - Air Compressor. - Filter wrench (SST). - Fuel container. - Covering blanket. - Fuel pressure gauge. - Overall. - Safety boots.	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						manual. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while servicing fuel systems. • Safe handling of tools, equipment and parts. • Waste disposal.	• Gloves. • Safety clear glasses.	
		(e) Perform fuel system bleeding.	Discussion Guide students to describe concept of fuel system bleeding Practical work Guide students on how to perform fuel system bleeding Activity Organize students in manageable group to perform fuel system bleeding	Students should be able to: • Select tools and equipment • Bleed diesel fuel system. • Test performance of fuel system. • Observe safety precautions • Clean tools, equipment	Bleeding fuel system conforms to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Bleed fuel system. Principles: Students should explain principles of bleeding fuel systems. Theories: Students should explain: • Procedures for bleeding fuel systems. • Importance of bleeding fuel system. • Use of service	The following tools, equipment and safety gears are to be available: • Vehicle or stationary engine. • Service manual. • Tool kit. • Air Compressor. • Filter wrench (SST). • Fuel container. • Covering blanket. • Fuel pressure	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				and work place. • Store tools and equipment.		manual. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while bleeding fuel system. • Safe handling of tools, equipment and parts. • Waste disposal.	gauge. • Overall. • Safety boots. • Gloves. • Safety clear glasses.	
	6.3 Servicing Cooling Systems	(a) Checking engine coolant.	Brainstorm Guide students to define, identify function of engine coolant Practical work Guide students on how to check engine coolant Activity Organize students in manageable group to check engine coolant.	Students should be able to: • Select tools and equipment • Check engine coolant. • Test cooling system performance • Observe safety precautions • Clean tools,	Engine coolant checked according to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Flush cooling systems. • Test radiator cap. Principles: Students should explain the principles of: • Using cooling system analyzer. Theories: Students should explain: • Functions of cooling system and components. • Types of cooling	The following tools, equipment and safety gears are to be available: • Engine with complete cooling system. • Thermometer. • Tool kit. • Cooling system analyser. • Water container. • Service manual. • Block check	164

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				equipment and work place. • Store tools and equipment.		systems and components. • Causes of engine overheating/under cooling. • Coolant additives. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while servicing cooling systems. • Safe handling of work tools and equipment. • Waste disposal.	tester. • Air compressor. • Gloves. • Overall. • Safety boots. • Safety clear glasses.	
		(b) Replacing fan belt.	Brainstorm Guide students to define terms, identify function of fan belt Practical work Guide students on how to replace fan belt Activity Organize students in manageable group to	Students should be able to: • Select tools and equipment • Replace fan and belts. • Test cooling system performance. • Observe	Fan belt functions according to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Adjust fan belts. Principles: Students should explain the principles of: Theories: Students should explain: • Functions of fan belt • Procedures for	The following tools, equipment and safety gears are to be available: • Engine with complete cooling system. • Thermometer. • Tool kit. • Cooling system analyzer.	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			replace fan belt	safety precautions • Clean tools, equipment and work place. • Store tools and equipment.		replacing fan belt Circumstantial knowledge: Detailed knowledge about: • Safety precautions while replacing fan belt. • Safe handling of work tools and equipment. • Waste disposal.	• Water container. • Service manual. • Block check tester. • Air compressor. • Overall. • Safety boots. • Safety clear glasses.	
		(c) Checking operation of thermostat	Brainstorm Guide students to define, identify function of thermostat Practical work Guide students on how to check operation of thermostat Activity Organize students in manageable group to check operation of thermostat	Students should be able to: • Select tools and equipment • Check operation of thermostat. • Observe safety precautions • Clean tools, equipment and work place.	Thermostat Functions according to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: Check operation of thermostat Principles: Students should explain the principles of: • Checking operation of thermostat Theories: Students should explain: • Procedures for checking operation of thermostat Circumstantial	The following tools, equipment and safety gears are to be available: • Engine with complete cooling system. • Thermometer. • Tool kit. • Cooling system analyser. • Water container. • Service manual.	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				Store tools and equipment.		knowledge: Detailed knowledge about: - Safety precautions while Checking operation of thermostat - Safe handling of work tools and equipment. - Waste disposal.	- Block check tester. - Air compressor. - Gloves. - Overall. - Safety boots. - Safety clear glasses.	
		(d) Servicing radiator	Brainstorm Guide students to define, Identify function of radiator Practical work Guide students on how to service radiator Activity Organize students in manageable group to service radiator	Students should be able to: - Select tools and equipment - Observe safety precautions - Service radiator - Clean tools, equipment and work place. - Store tools and equipment.	Serviced radiator functions according to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Test radiator cap. - Service radiator Principles: Students should explain the principles of: - Servicing radiator Theories: Students should explain: - Coolant additives. Circumstantial knowledge: Detailed knowledge about: Safety precautions while servicing radiator	The following tools, equipment and safety gears are to be available: - Engine with complete cooling system. - Thermometer. - Tool kit. - Cooling system analyzer. - Water container. - Service manual. - Block check tester.	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Num ber of Perio ds per Unit
				Process Assessment	Product/S ervices Assessme nt	Knowledge Assessment		
						- Safe handling of work tools and equipment. - Waste disposal.	- Air compressor. - Gloves. - Overall. - Safety boots. - Safety clear glasses.	
		(e) Servicing water pump	Brainstorm Guide students to define terms, identify function of water pump Practical work Guide students on how to service water pump Activity Organize students in manageable group to service water pump	Students should be able to: - Select tools and equipment - Service water pump. - Test water pump performance. - Observe safety precautions - Clean tools, equipment and work place. - Store tools and equipment.	Serviced Water pump functions according to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Service water pump. Principles: Students should explain the principles of: - Servicing water pump Theories: Students should explain: - Procedures for servicing water pump - Functions of water pump Circumstantial knowledge: Detailed knowledge about: - Safety precautions	The following tools, equipment and safety gears are to be available: - Engine with complete cooling system. - Thermometer. - Tool kit. - Water container. - Service manual. - Air compressor. - Gloves. - Overall. - Safety boots. - Safety clear glasses.	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						while servicing water pump • Safe handling of work tools and equipment. • Waste disposal.		
	6.4 Servicing transmission systems	(a) Checking clutch free play	Brainstorm Guide students to describe concept of clutch Practical work Guide students on how to check clutch free play Activity Organize students in manageable group to check clutch free play	Students should be able to: • Select tools and equipment • Check clutch free play. • Observe safety precautions • Clean tools, equipment and work place. • Store tools, equipment and parts.	Checked clutch free play conforms to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: Check clutch free play Principles: Students should explain the principles of Checking clutch free play Theories: Students should explain: • Functions of clutch and components. • Types of transmission system and components. • Types of lubrication systems. • Use of service manual. Circumstantial knowledge:	The following tools, equipment and safety gears are to be available: • Vehicle. • Service manual. • Tool kit. • Oil container with supply pipe and pump. • Drain plug spanner (SST). • Stethoscope. • Service pit/vehicle hoist. • Overall. • Gloves. • Safety boots. • Safety clear glasses.	171

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Num ber of Perio ds per Unit
				Process Assessment	Product/S ervices Assessme nt	Knowledge Assessment		
						Detailed knowledge about: • Safety precautions while checking clutch free play. • Waste disposal.		
		(b) Servicing gear box.	Brainstorm Guide students to define, Identify function of gear box Practical work Guide students on how to service gear box Activity Organize students in manageable group to service gear box	Students should be able to: • Select tools and equipment • Service gearbox. • Observe safety precautions • Clean tools, equipment and work place. • Store tools, equipment and parts.	Gear box conforms to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Change gearbox oil Principles: Students should explain the principles of servicing gear box Theories: Students should explain: • Functions of gear box • Properties of gearbox oil • Use of service manual. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while servicing gear box	The following tools, equipment and safety gears are to be available: • Vehicle. • Service manual. • Tool kit. • Oil container with supply pipe and pump. • Drain plug spanner (SST). • Stethoscope. • Service pit/vehicle hoist. • Overall. • Gloves. • Safety boots. • Safety clear glasses.	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						- Safe handling of work tools and equipment. - Waste disposal.		
		(c) Servicing propeller shaft.	Brainstorm Guide students to define, identify function of propeller shaft Practical work Guide students on how to service propeller shaft Activity Organize students in manageable group to Service propeller shaft	Students should be able to: - Select tools and equipment - Service propeller shaft. - Observe safety precautions - Clean tools, equipment and work place. - Store tools, equipment and parts.	Serviced propeller shaft conforms to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Service propeller shaft cross joints. Principles: Students should explain the principles of servicing propeller shaft. Theories: Students should explain: - Functions of propeller shaft - Procedures for servicing propeller shaft. - Use of service manual. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while servicing propeller shaft..	The following tools, equipment and safety gears are to be available: - Vehicle. - Service manual. - Tool kit. - Oil container with supply pipe and pump. - Drain plug spanner (SST). - Stethoscope. - Service pit/vehicle hoist. - Overall. - Gloves. - Safety boots. - Safety clear glasses.	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Num ber of Perio ds per Unit
				Process Assessment	Product/S ervices Assessme nt	Knowledge Assessment		
						- Safe handling of work tools and equipment. - Waste disposal.		
		(d) Servicing final drive.	Brainstorm Guide students to define, identify function of final drive Practical work Guide students on how to service final drive Activity Organize students in manageable group to service final drive	Students should be able to: - Select tools and equipment - Service final drive and differential - Observe safety precautions - Clean tools, equipment and work place. - Store tools, equipment and parts.	Serviced final drive conforms to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Change final drive oils. Principles: Students should explain the principles of servicing final drive. Theories: Students should explain: - Functions of final drive - Properties of final drive oil. - Adjustments of final drive gears - Use of service manual. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while servicing of	The following tools, equipment and safety gears are to be available: - Vehicle. - Service manual. - Tool kit. - Oil container with supply pipe and pump. - Drain plug spanner (SST). - Stethoscope. - Service pit/vehicle hoist. - Overall. - Gloves. - Safety boots. - Safety clear glasses.	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						final drive • Safe handling of work tools and equipment. • Waste disposal.		
		(e) Servicing power take off (P.T.O.)	Brainstorm Guide students to define, identify function of power take off (P.T.O.) Practical work Guide students on how to service power take off (P.T.O.) Activity Organize students in manageable group to service power take off (P.T.O.)	Students should be able to: • Select tools and equipment • Service power take off (P.T.O.) • Observe safety precautions • Clean tools, equipment and work place. • Store tools, equipment and parts.	Power take off (P.T.O.) conforms to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Service power take off (P.T.O.). Principles: Students should explain the principles of servicing power take off (P.T.O.) Theories: Students should explain: • Functions of power take off (P.T.O.) • Importance of servicing power take off (P.T.O.) • Use of service manual. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while servicing	The following tools, equipment and safety gears are to be available: • Vehicle. • Service manual. • Tool kit. • Oil container with supply pipe and pump. • Drain plug spanner (SST). • Stethoscope. • Service pit/vehicle hoist. • Overall. • Gloves. • Safety boots. • Safety clear glasses.	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Num ber of Perio ds per Unit
				Process Assessment	Product/S ervices Assessme nt	Knowledge Assessment		
						power take off (P.T.O.) • Safe handling of work tools and equipment. • Waste disposal.		
		(f) Servicing draw bar	Brainstorm Guide students to describe concept of draw bar Practical work Guide students on how to service draw bar Activity Organize students in manageable group to service draw bar	Students should be able to: • Select tools and equipment • Service draw bar • Observe safety precautions • Clean tools, equipment and work place. • Store tools, equipment and parts.	Serviced draw bar conforms to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Service draw bar. Principles: Students should explain the principles of servicing draw bar Theories: Students should explain: • Functions of draw bar • Importance of servicing draw bar • Use of service manual. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while draw bar • Safe handling of	The following tools, equipment and safety gears are to be available: • Vehicle. • Service manual. • Tool kit. • Oil container with supply pipe and pump. • Drain plug spanner (SST). • Stethoscope. • Service pit/vehicle hoist. • Overall. • Gloves. • Safety boots. • Safety clear glasses.	

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Num ber of Perio ds per Unit
				Process Assessment	Product/S ervices Assessme nt	Knowledge Assessment		
						work tools and equipment. • Waste disposal.		
	6.5 Performing Greasing	(a) Carrying out chassis greasing	Brainstorm Guide students to define terms, identify function of chassis Practical work Guide students on how to carry out chassis greasing Activity Organize students in manageable group to carry out chassis greasing	Students should be able to: • Select tools and equipment • Carry out chassis greasing. • Observe safety precautions • Clean tools, equipment and work place. • Store tools and equipment.	Greased parts conform to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Clean clogged nipples • Lubricate body parts. • Lubricate door hinges. Principles: Students should explain the principles of greasing. Theories: Students should explain: • Types of grease and their use. • Tools used to perform greasing. • The importance of greasing chassis and body parts. Circumstantial knowledge: Detailed knowledge about: • Safety precautions	The following tools, equipment and safety gears are to be available: • Vehicle. • Grease gun/grease pump. • Tool kit. • Wheel blocks. • Floor jack. • Safety stands. • Gloves • Overall. • Safety boots. • Safety clear glasses.	50

Module title (main competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Num ber of Perio ds per Unit
				Process Assessment	Product/S ervices Assessme nt	Knowledge Assessment		
						while greasing. • Safe handling of tools and equipment. • Waste disposal.		
		(b) Lubricating door locks and hinges	Brainstorm Guide students to define, identify function of door locks and hinges Practical work Guide students on how to lubricate door locks and hinges Activity Organize students in manageable group to lubricate door locks and hinges	Students should be able to: • Select tools and equipment • Lubricate door locks and hinges. • Observe safety precautions • Clean tools, equipment and work place. • Store tools and equipment.	Lubricated door locks and hinges conform to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Lubricate door locks and hinges Principles: Students should explain the principles of greasing. Theories: Students should explain: • Procedures for Lubricating door locks and hinges. • Tools used to lubricate door locks and hinges. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while Lubricating door locks and hinges.	The following tools, equipment and safety gears are to be available: • Vehicle. • Grease gun/grease pump. • Tool kit. • Wheel blocks. • Floor jack. • Safety stands. • 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	Num ber of Perio ds per Unit
				Process Assessment	Product/S ervices Assessme nt	Knowledge Assessment		
						• Safe handling of tools and equipment. • Waste disposal.		

Form Two

Table 4: Detailed Contents for Form Two

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
1.0. Carrying out repair of wheels and tyres	1.1. Replacing tyres	(a) Replacing worn tyre	Discussion Guide students to describe concept of tyre Demonstration Demonstrate to students on how to replace worn tyre Activity Organize students in manageable groups to replace worn tyre	Students should be able to: • Select tools and equipment. • Inspect tyres for wear. • Replace tyre. • Observe safety precautions. • Clean tools, equipment and work place. • Store tools and equipment.	Replaced worn tyres function according to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Replace worn tyres. Principles: Students should explain the principles of: • Construction of wheels and tyres. • Replacing worn tyres. Theories: Students should explain: • Functions of tyres. • Types of wheels and tyres. • Interpretation of tyre dimensions and specifications.	The following tools, equipment and safety gears are to be available: • Vehicle. • Stopper/blocks. • Jack. • Wheel spanner. • Air compressor • Tyre pressure chart/service manual. • Pressure gauge. • Tyre changer machine. • Tyre lever. • File. • Knife. • Hot	44

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						- Properties of tyres. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while replacing worn tyres. - Safe handling of work tools and equipment. - Waste disposal.	vulcanizing machine. - Valve key. - Plier. - Depth gauge. - Tyre rag. - Forklift/crane wagon. - Helmet. - Gloves. - Safety boots. - Overall. - Safety clear glasses. - Mask.	
		(b) Refilling foam material in tyre	Discussion Guide students to describe concept of foam material in tyre Demonstration Demonstrate to students on how to refill foam material in tyre Activity Organize students in	Students should be able to: - Select tools and equipment. - Inspect tyres for wear. - Replace tyre. - Refill tyre pressure and foam materials.	Refilled foam material in tyre function according to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Refill tyre pressure and foam materials. Principles: Students should explain the principles of: - Refill foam material in tyre.	The following tools, equipment and safety gears are to be available: - Vehicle. - Stopper/blocks. - Jack. - Wheel spanner. - Air compressor. - Tyre pressure	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			manageable groups to refill foam material tyre	- Observe safety precautions. - Clean tools, equipment and work place. - Store tools and equipment.		Theories: Students should explain: - Importance of performing refill foam material in tyre. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while refill foam material in tyre - Safe handling of work tools and equipment. - Waste disposal.	chart/service manual. - Pressure gauge. - Tyre changer machine. - Tyre lever. - File. - Knife. - Valve key. - Plier. - Depth gauge. - Tyre rag. - Forklift/crane wagon. - Helmet. - Gloves. - Safety boots. - Overall.	
		(c) Performing tyre rotation	Discussion Guide students to describe concept of tyre rotation Demonstration Demonstrate to students on how	Students should be able to: - Select tools and equipment. - Inspect tyres for wear.	Tyre rotated according to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: Perform tyre rotation.	The following tools, equipment and safety gears are to be available: - Vehicle. - Stopper/blocks. - Jack.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			to perform tyre rotation Activity Organize students in manageable group to perform tyre rotation	- Perform tyre rotation. - Observe safety precautions. - Clean tools, equipment and work place. - Store tools and equipment.		Principles: Students should explain the principles of: - Tyre rotation. Theories: Students should explain: - Importance of performing tyre rotation. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while tyre rotation. - Safe handling of work tools and equipment. - Waste disposal.	- Wheel spanner. - Air compressor. - Tyre pressure chart/service manual. - Pressure gauge. - Tyre changer machine. - Tyre lever. - Valve key. - Tyre rag. - Forklift/crane wagon. - Helmet. - Gloves - Safety boots - Overall	
	1.2. Repairing tube and tubeless tyres	(a) Repairing tube tyre.	Discussion Guide students to describe tube tyre Demonstration Demonstrate to students on how to repair tube	Students should be able to: - Select tools and equipment. - Repair tube tyre. - Check tyre	Repaired tube tyre conforms to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: Repair tube tyre. Principles: Students	The following tools, equipment and safety gears are to be available: - Vehicle - Jacks - Wheel spanners	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	Product/Services Assessment	Knowledge Assessment		
			tyre Practical Organize students in manageable group to repair tube tyre	pressure. - Observe safety precautions. - Clean tools, equipment and work place. - Store tools and equipment.		should explain the principles of: - Construction of tube tyres. - Repairing tube tyres. Theories: Students should explain: - Advantages of tube tyres. - Tread wear pattern - Factors affecting tyre life - Importance of maintaining tyre pressure Circumstantial knowledge: Detailed knowledge about: - Safety precautions while repairing tube tyres - Safe handling of tools and equipment - Waste disposal.	- Tyre lever. - Hammer or tyre bead breaker. - Tyre changer - Air compressor. - Depth gauge. - Water bath. - Puncture repair kit. - Pressure gauge. - Service manual. - Hot vulcanizing machine. - Wheel blocks. - Support/safety stands. - Safety boots. - Overalls. - Gloves. Safety clear glasses.	
		(b) Repairing tubeless tyre	Discussion Guide students	Students should be able	Repaired tubeless tyre	Knowledge evidence:	The following tools, equipment	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			to explain concept of tubeless tyre Demonstration Demonstrate to students on how to repair tubeless tyre Activity Organize students in manageable group to repair tubeless tyre	to: • Select tools and equipment. • Repair tubeless tyre. • Check tyre pressure. • Observe safety precautions. • Clean tools, equipment and work place. • Store tools and equipment.	conforms to technical specifications.	Detailed knowledge of: Method used: Students should explain how to: • Repair tubeless tyre. Principles: Students should explain the principles of: • Construction of tubeless tyres. • Repairing tubeless tyres. Theories: Students should explain: • Advantages of tubeless tyres • Tread wear pattern. • Factors affecting tubeless tyre life. • Importance of maintaining tubeless tyre pressure. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while	and safety gears are to be available: • Vehicle. • Jacks. • Wheel spanners. • Tyre lever. • Hammer or tyre bead breaker. • Tyre changer. • Air compressor. • Depth gauge. • Water bath. • Puncture repair kit. • Pressure gauge. • Service manual. • Support/safety stands. • Safety boots. • Overalls. • Gloves. • Safety clear glasses.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						servicing tubeless tyres. - Safe handling of tools and equipment. - Waste disposal.		
	1.3. Performing wheel balancing	(a) Carrying out dynamic balance	Question and answer Guide students to explain concept of dynamic balance Practical work Guide students on how to carry out dynamic balance Activity Organize students in manageable group to carry out dynamic balance	Students should be able to: - Select tools and equipment. - Carry dynamic balance. - Observe safety precautions. - Clean tools, equipment and work place. - Store tools and equipment.	Wheel dynamic balanced conform to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Balance wheels dynamically. Principles: Students should explain the principles of: - Dynamic balance - Operating wheel dynamic balance machines. Theories: Students should explain: - Types of wheel dynamic balance machines. - Importance of wheel dynamic balancing. Circumstantial knowledge:	The following tools, equipment and safety gears are to be available: - Vehicle. - Wheel balancing machine, tools and accessories. - Dynamic Balancing weights. - Wheels and tyres. - Wire brush. - Air compressor - Valve key. - Hammer. - Jack. - Wheel spanner. - Service	44

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						Detailed knowledge about: - Safety precautions while performing wheel dynamic balancing. - Safe handling of work tools and equipment. - Waste disposal.	- manual. - Pressure gauge. - Blocks/wedges. - Safety stand. - Gloves. - Safety boots. - Overall.	
		(b) Performing tyre rotation	Discussion Guide students to describe concept of tyre rotation Demonstration Demonstrate to students on how to perform tyre rotation. Activity Organize students in manageable group to perform tyre rotation	Students should be able to: - Select tools and equipment. - Perform tyre rotation. - Observe safety precautions. - Clean tools, equipment and work place. - Store tools and equipment.	Tyre rotated according to technical specification	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Perform tyre rotation. Principles: Students should explain the principles of: - Importance of performing tyre rotation. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while	The following tools, equipment and safety gears are to be available: - Vehicle. - Wheel balancing machine, tools and accessories. - Balancing weights. - Wheels and tyres. - Wire brush. - Air compressor - Valve key. - Hammer.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						performing tyre rotation. • Safe handling of work tools and equipment. • Waste disposal.	• Jack. • Wheel spanner. • Service manual. • Pressure gauge. • Blocks/wedges. • Safety stand. • Gloves. • Safety boots. • Overall. • Safety clear glass.	
	1.4. Servicing wheel hubs	(c) Servicing wheel hub components	Discussion Guide students to define wheel hub Practical work Guide students on how to Service wheel hub components Activity Organize students in manageable groups to service wheel	Students should be able to: • Select tools and equipment. • Service wheel hub components. • Test wheel hub. • Observe safety precautions.	Serviced wheel hub conforms to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Service wheel hub components. Principles: Students should explain the principle of construction and operation of wheel hubs. Theories: Students should explain:	The following tools, equipment and safety gears are to be available: • Vehicle. • Jack. • Tool kit. • Service manual. • Wheel spanner. • Tyre lever. • Spring balance. • Pin	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	Product/Services Assessment	Knowledge Assessment		
			hub components	• Clean tools, equipment and work place. • Store tools and equipment.		• Function of wheel hubs. • Types of wheel hubs. • Importance of wheel hub service. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while servicing wheel hub. • Safe handling of tools and equipment. • Waste disposal.	• punch/drift. • Stoppers/blocks/wedge • Dial indicator. • Overall. • Safety boots. • Gloves. • Safety clear glasses.	
		(d) Adjusting wheel bearing taps play	Question and answer Guide students to define wheel bearing Practical work Guide students on how to adjust wheel bearing taps play	Students should be able to: • Select tools and equipment. • Adjust wheel bearing free play. • Test wheel bearing free play.	Serviced wheel hub conforms to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Adjust wheel bearing. Principles: Students should explain the principle of construction and	The following tools, equipment and safety gears are to be available: • Vehicle. • Jack. • Tool kit. • Service manual. • Wheel spanner.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Activity Organize students in manageable group to adjust wheel bearing taps play	- Observe safety precautions. - Clean tools, equipment and work place. - Store tools and equipment.		operation of wheel hubs. Theories: Students should explain: - Types of bearings. - Importance of wheel bearing service. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while servicing wheel bearing. - Safe handling of tools and equipment. - Waste disposal.	- Tyre lever. - Spring balance. - Pin punch/drift. - Stoppers/blocks/wedge - Dial indicator. - Overall. - Safety boots. - Gloves.	
2.0. Servicing steering systems	2.1. Performing wheel alignment	(a) Replacing steering joints and linkages.	Brainstorm Guide students to describe concept of steering joints and linkages Practical work Guide students on how to replace steering	Students should be able to: - Select tools and equipment. - Rectify steering system and components.	Replaced steering joints and linkages as per technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: Align steering. Principles: Students should explain the principles of:	The following tools, equipment and safety gears are to be available: - Service manual. - Complete vehicle with driver. - Tool kit.	34

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			joints and linkages Activity Organize students in manageable group to replace steering joints and linkages	- Align steering wheel. - Observe safety precautions. - Organize road test. - Clean tools, equipment and work place. - Store tools, equipment and parts.		- Aligning steering. Theories: Students should explain: - Steering geometry. - Causes of steering misalignments. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while replace steering joint and linkage. - Safe handling of work tools, equipment and parts. - Waste disposal.	- Air compressor. - Pipe wrench. - Kingpin gauge. - Turn table. - Side slip tester. - Vernier height gauge. - Puller. - Hammer. - Gloves - Overall. - Safety boots. - Safety goggles. - Helmet.	
		(b) Performing wheel alignment	Brainstorm Guide students to define wheel alignment Practical work Guide students on how to perform wheel alignment	Students should be able to: - Select tools and equipment. - Adjust camber angle. - Adjust	Wheel alignment performed as per technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: Adjust toe in and toe out. Principles: Students	The following tools, equipment and safety gears are to be available: - Service manual. - Complete vehicle with driver.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Activity Organize students in manageable group to perform wheel alignment	king pin inclination - Adjust toe in/toe out. - Align steering wheel. - Observe safety precautions. - Organize road test. - Clean tools, equipment and work place. - Store tools, equipment and parts.		should explain the principles of: - Aligning wheels. - Checking wheel turning radius. Theories: Students should explain: - Adjust camber angle - Adjust castor angle - Check kingpin inclination - Importance of wheel alignment. - Causes of wheel misalignments. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while performing wheel alignment. - Safe handling of work tools, equipment and parts. - Waste disposal.	- Tool kit. - Wheel alignment gauges/equipment. - Air compressor. - Pipe wrench. - Camber/cast or gauge. - Kingpin gauge. - Turn table. - Tyre pressure gauge. - Side slip tester. - Vernier height gauge. - Puller. - Hammer. - Gloves - Overall. - Safety boots. - Safety goggles.	
	2.2. Servicing steering	(a) Overhauling steering box.	Discussion Guide students	Students should be able	Serviced steering box	Knowledge evidence:	The following tools, equipment	34

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
	boxes		to define steering box. Demonstration Guide students on how to overhaul steering box Activity Organize students in manageable groups to overhaul steering box	to: - Select tools and equipments. - Dismantle steering box. - Clean parts. - Inspect parts. - Replace worn out parts. - Reassemble steering box. - Install steering box. - Align wheels. - Observe safety precautions. - Test steering box. - Clean tools,	conforms to technical specifications.	Detailed knowledge of: Method used: Students should explain how to: - Dismantle steering box. - Service steering box. - Assemble steering box. Principles: Students should explain the principles of: - Constructing steering boxes. - Operation of steering box. Theories: Students should explain: - Functions of steering box. - Types of steering boxes. - Required service on steering boxes. - Steering ratio. - Steering columns. Circumstantial knowledge:	and safety gears are to be available: - Vehicle / tractor. - Steering box assembly. - Service manual. - Tool box. - Work bench. - Bench vice. - Oil container. - Set of screw driver. - Ball pein hammer. - Plastic hammer. - Spring balance. - Puller. - Overall. - Safety boots. - Gloves. - Safety goggles.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				equipment and work place. • Store tools, equipment and parts.		Detailed knowledge about: • Safety precautions while servicing steering boxes. • Safe handling of working tools. • Waste disposal.		
		(b) Adjusting steering box backlash.	Discussion Guide students to define steering box backlash Demonstration Guide students on how to adjust steering box backlash Activity Organize students in manageable group to adjust steering box backlash	Students should be able to: • Select tools and equipments. • Dismantle steering box. • Clean parts. • Inspect parts. • Replace worn out parts. • Reassemble steering box. • Install steering box.	Serviced steering box conforms to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Dismantle steering box. • Service steering box. • Assemble steering box. Principles: Students should explain the principles of: • Constructing steering boxes. • Operation of steering box. Theories: Students should explain: • Functions of	The following tools, equipment and safety gears are to be available: • Vehicle / tractor. • Steering box assembly. • Service manual. • Tool box. • Work bench. • Bench vice. • Oil container. • Set of screw driver. • Ball peen hammer. • Plastic hammer.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				- Adjust steering box free play. - Observe safety precautions. - Test steering box. - Clean tools, equipment and work place. - Store tools, equipment and parts.		steering box. - Types of steering boxes backlash. - Required service on steering boxes backlash. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while adjusting steering boxes. - Safe handling of working tools. Waste disposal.	- Spring balance. - Puller. - Overall. - Safety boots. - Gloves. - Safety goggles.	
	2.3. Servicing power steering systems	(c) Overhauling power steering pump	Discussion Guide students to describe concept of power steering pump Demonstration Guide students on how to Overhaul power	Students should be able to: - Select tools and equipment. - Check steering system fluid level and	Power steering pump serviced as per technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: Bleed steering system. Principles: Students should explain the	The following tools, equipment and safety gears are to be available: - Vehicle / tractor with power steering system. - Service	34

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			steering pump Activity Organize students in manageable group to overhaul power steering pump	condition. • Dismantle power steering pump. • Service power steering pump • Refit power steering. • Perform bleeding of steering system. • Observe safety precautions. • Test steering system. • Clean tools, equipment and work place. • Store tools, equipment and parts.		principles of: • Construction of operation of power steering system. • Servicing hydraulic power steering boxes. Theories: Students should explain: • Purpose of steering system. • Power steering systems fault. • Characteristics of hydraulic fluids. • Types of power steering systems. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while servicing power steering system. • Safe handling of work tools and equipment. Waste disposal.	manual. • Tool kit • Work bench. • Service pit/hoist. • Oil container. • Flow meter. • Plastic hammer. • Ball peen Hammer. • Spring balance. • Puller. • Gloves. • Overall. • Safety boots. • Safety clear glasses. • Helmet.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
		(d) Servicing power steering components	Discussion Guide students to define power steering components Practical work Guide students on how to service power steering components Activity Organize students in manageable group to service power steering components	Students should be able to: • Select tools and equipment. • Dismantle power steering components. • Service power steering components • Assemble power steering components • Observe safety precautions. • Test steering system. • Clean tools, equipment and work	Power steering system serviced as per technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Check steering system. • Dismantle power steering components. • Replace defective components. • Assemble power steering components Principles: Students should explain the principles of: • Construction of operation of steering system. • Servicing power steering. Theories: Students should explain: • Purpose of steering system. • Power steering systems fault. • Types of power	The following tools, equipment and safety gears are to be available: • Vehicle / tractor with power steering system. • Service manual. • Tool kit • Work bench. • Service pit/hoist. • Oil container. • Flow meter. • Plastic hammer. • Ball peen Hammer. • Spring balance. • Puller. • Gloves. • Overall. • Safety boots. • Safety clear glasses.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				- place. - Store tools, equipment and parts.		steering systems. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while servicing steering system. - Safe handling of work tools and equipment. - Waste disposal.	Helmet.	
3.0. Repairing brakes	3.1. Servicing hydraulic brakes	(a) Servicing brake pads	Discussion Guide students to describe concept of brake pads Practical work Guide students on how to service brake pads Activity Organize students in manageable groups to service brake pads	Students should be able to: - Select tools and equipment. - Identify brake components. - Secure brake attachments. - Adjust brakes. - Re-assemble brake	Serviced brake pads conform to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Adjust brakes pad. Principles: Students should explain the principles of: - Construction and operation of brake pads. Theories: Students should explain: - Types of brake pads.	The following tools, equipment and safety gears are to be available: - Service manual. - Vehicle / tractor with hydraulic brakes. - Tool kit. - Bench vice. - Wheel blocks. - Brake shoe relining machine. - Hammer.	35

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				- component s. - Observe safety precaution s. - Test hydraulic brakes. - Clean tools, equipment and work place. - Store tools, equipment and parts.		- Characteristics of the brake pad. - Functions of brake pad. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while servicing brakes pad. - Safe handling of work tools and equipment. - Waste disposal.	- Grinding machine. - Pressure gauge. - Jack. - Safety stands. - Safety boots. - Overall. - Mask. - Gloves.	
		(b) Servicing brake linings	Brainstorm Guide students to define brake linings Practical work Guide students on how to service brake lining Activity Organize students in	Students should be able to: - Select tools and equipment. - Identify brake lining component s. - Dismantle brake lining	Serviced brakes linings conform to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Adjust brakes lining. Principles: Students should explain the principles of: - Construction and operation of	The following tools, equipment and safety gears are to be available: - Service manual. - Vehicle / tractor with hydraulic brakes. - Tool kit. - Bench vice. - Wheel	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			manageable groups to service brake linings	component s. • Service brake lining component s. • Assemble brake lining component s. • Observe safety precaution s. • Test hydraulic brakes. • Clean tools, equipment and work place. • Store tools, equipment and parts.		brake system components. Theories: Students should explain: • Functions of brake lining. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while servicing brakes lining. • Safe handling of work tools and equipment. • Waste disposal.	blocks. • Brake shoe relining machine. • Hammer. • Grinding machine. • Pressure gauge. • Jack. • Safety stands. • Safety boots. • Overall. • Mask. • Gloves. • Safety clear glass.	
	3.2. Servicing antilock braking system (abs)	(a) Troubleshooting antilock brake system (ABS)	Brainstorm Guide students to define antilock brake	Students should be able to: • Select	Serviced antilock brake system operates	Knowledge evidence: Detailed knowledge of:	The following tools, equipment and safety gears are to be	35

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				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			system (ABS) Practical work Guide students on how to Troubleshoot antilock brake system (ABS) Activity Organize students in manageable groups to troubleshooting the antilock brake system	tools and equipment. • Perform on-board diagnosis. • Troubleshoot ABS unit. • Troubleshoot electronically controlled unit (ECU). • Observe safety precautions. • Clean tools, equipment and workplace • Store tools, equipment and parts.	according to technical specifications.	Method used: Students should explain how to: • Troubleshoot brake system with ABS. Principles: Students should explain the principle of: • Construction and operation of ABS. • Trouble-shooting Antilock Brake System components. Theories: Students should explain: • Function of antilock braking system. • Antilock brake system electronic circuit • Main parts of antilock brake system. • Advantages of ABS over conventional brake system. Circumstantial	available: • Vehicle with ABS. • Service manual. • Diagnostic computer. • Tool kit. • Bleeding tools. • Multimeters. • Hoist. • Bench vice. • Work bench. • Jacks. • Safety stands. • Gloves. • Safety boots. • Overall. • Safety goggles.	

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				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						knowledge: Detailed knowledge about: - Safety precautions while servicing antilock braking system (ABS). - Safe handling of work tools and equipment. - Waste disposal.		
		(b) Servicing antilock brake system (ABS)	Brainstorm Guide students to define the antilock brake system Demonstration Guide students on how to Service antilock brake system (ABS) Activity Organize students in manageable groups to service antilock brake system	Students should be able to: - Select tools and equipment. - Rectify ABS faults. - Bleed brake system. - Observe safety precautions. - Test antilock brake system	Serviced antilock brake system operates according to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Service brake system with ABS. - Bleed braking system. Principles: Students should explain the principle of: - Bleeding braking system with ABS. Theories: Students should explain:	The following tools, equipment and safety gears are to be available: - Vehicle with ABS. - Service manual. - Diagnostic computer. - Tool kit. - Bleeding tools. - Multimeters. - Hoist. - Bench vice. - Work bench. - Jacks.	

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				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				- operation. - Clean tools, equipment and workplace - Store tools, equipment and parts.		- Important of servicing antilock braking system. - Procedure of service Antilock brake system electronic circuit Circumstantial knowledge: Detailed knowledge about: - Safety precautions while servicing antilock braking system (ABS). - Safe handling of work tools and equipment. - Waste disposal.	- Safety stands. - Gloves. - Safety boots. - Overall. - Safety goggles.	
4.0. Maintaining suspension systems	4.1. Replacing suspension bushes	(a) Replacing spring bushes.	Discussion Guide students to define spring bushes Demonstrate Guide students on how to replace spring bushes Activity	Students should be able to: - Select tools and equipment. - Locate defective spring brushes. - Replace spring	Serviced spring bushes conform to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Inspect spring bushes. - Replace spring bushes. Principles: Students	The following tools, equipment and safety gears are to be available: - Tool kit. - Jack. - Vehicle. - Stop blocks/wedges. - Wire brush.	25

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				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Organize students in manageable group to replace spring bushes	brushes. - Observe safety precautions. - Clean, tools, equipment and work place. - Store tools and equipment.		should explain the principles of: - Lubricating spring bushes. - Replacing suspension bushes. - Construction and operation of spring bushes. Theories: Students should explain: - Function of spring bushes. - Type of spring bushes - Procedure for replacing spring bushes. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while replacing spring bushes. - Safe handling of work tools and equipment. - Waste disposal.	- Tyre lever. - Drift/round punch. - Wheel spanner. - Set of pullers. - Safety boot. - Gloves. - Safety stand. - Helmet. - Overall. - Safety clear glasses.	
		(b) Replacing	Brainstorm	Students	Serviced	Knowledge	The following	

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		stabilizer bushes	Guide students in defining stabiliser bushes Practical work Guide students on how to replace stabilizer bushes Activity Organize students in manageable groups to replace stabilizer bushes	should be able to: • Select tools and equipment. • Locate defective stabilizer bushes. • Replace stabilizer rubber brushes. • Observe safety precautions. • Clean, tools, equipment and work place. • Store tools and equipment.	stabilizer bushes conform to manufacturer's specifications.	evidence: Detailed knowledge of: Method used: Students should explain how to: • Inspect stabilizer bushes. • Replace stabilizer bushes. Principles: Students should explain the principles of: • Construction and operation of stabilizer bushes. Theories: Students should explain: • Function of stabilizer bushes. • Types of stabilizer bushes. • Procedure for replacing stabilizer bushes. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while replacing	tools, equipment and safety gears are to be available: • Tool kit. • Jack. • Vehicle. • Stop blocks/wedges. • Wire brush. • Tyre lever. • Drift/round punch. • Wheel spanner. • Set of pullers. • Safety boot. • Gloves. • Safety stand. • Helmet. • Overall. • Safety clear glasses.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						stabilizer bushes. • Safe handling of work tools and equipment. • Waste disposal.		
	4.2. Replacing suspension shock absorbers	(a) Replacing telescopic shock absorber	Brainstorm Guide students to define telescopic shock absorber Practical work Guide students on how to replace telescopic shock absorber Activity Organize students in manageable groups to replace telescopic shock absorber	Students should be able to: • Select tools and equipment. • Replace the telescopic shock absorber. • Test shock absorber functionality. • Observe safety precautions. • Clean tools, equipment and workplace • Store tools and equipment.	Replaced telescopic shock absorber functions as per technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Check telescopic shock absorber condition. Principles: Students should explain the principles of: • Construction and operation of telescopic shock absorber. • Removing telescopic shock absorber. • Replacing telescopic shock absorber. Theories: Students should explain: • Purpose of telescopic shock	The following tools, equipment and safety gears are to be available: • Tool kit. • Jack. • Vehicle with shock absorber. • Safety stand. • Stop blocks/wedges. • Wire brush. • Mallet/rubber hammer. • Ruler. • Round punch. • Safety boots. • Overalls. • Gloves. • Safety clear glass. • Helmet.	25

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				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						absorber. - Types of telescopic shock absorbers. - Importance of replacing telescopic shock absorber Circumstantial knowledge: Detailed knowledge about: - Safety precautions while replacing telescopic shock absorber. - Safe handling of tools and equipment. - Waste disposal.		
		(b) Replacing McPherson strut shock absorber.	Brainstorm Guide students to define, McPherson strut shock absorber Practical work Guide students on how to replace McPherson strut	Students should be able to: - Select tools and equipment. - Replace McPherson strut type shock absorber.	Replaced McPherson strut shock absorber functions as per technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: Check McPherson strut shock absorber condition.	The following tools, equipment and safety gears are to be available: - Tool kit. - Jack. - Vehicle with shock absorber. - Safety stand.	

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				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			shock absorber Activity Organize students in manageable group to replace McPherson strut shock absorber	• Test McPherson strut shock absorber functionality. • Observe safety precautions. • Clean tools, equipment and workplace. • Store tools and equipment.		• Replace the McPherson strut shock absorber. Principles: Students should explain the principles of: • Construction and operation of McPherson strut shock absorber. • Theories: Students should explain: • Purpose of McPherson strut shock absorber. • Importance of replacing McPherson strut shock absorber. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while replacing McPherson strut shock absorber. • Safe handling of tools and equipment.	• Stop blocks/wedges. • Wire brush. • Mallet/rubber hammer. • Ruler. • Round punch. • Safety boots. • Overalls. • Gloves. • Safety clear glass. • Helmet.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						Waste disposal.		
	4.3. Replacing steel suspension springs	(a) Refitting coil springs.	Brainstorm Guide students to define coil springs Demonstration Guide students on how to Refit coil springs Practical Organize students in manageable groups to refit coil springs	Students should be able to: - Select tools and equipment. - Identify coil springs. - Replace coil spring. - Test coil springs functionality. - Observe safety precautions. - Clean, tools, equipment and work place. - Store tools and equipment.	Refitted coil springs function as per manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Inspect coil springs. - Test coil springs. Principles: Students should explain the principles of construction and operation of coil springs. Theories: Students should explain: - Function of coil springs. - Types of coil springs. - Importance of coil springs. - Importance of replacing coil springs. Circumstantial knowledge: Detailed knowledge about:	The following tools, equipment and safety gears are to be available: - Tool kit. - Service manual. - Jack. - Vehicle with steel springs. - Stop blocks/wedges. - Wire brush. - Greasing machine. - Hammer. - Drift/round punch. - Wheel spanner. - Puller. - Safety stand. - Safety boots. - Overall. - Gloves. - Safety clear glasses.	40

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				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						• Safety precautions while replacing coil springs. • Safe handling of work tools and equipment. • Waste disposal.		
		(b) Refitting leaf springs	Brainstorm: Guide students to define leaf springs Practical work Guide students on how to refit leaf springs Activity Organize students in manageable groups to refit leaf springs	Students should be able to: • Select tools and equipment. • Identify defective leaf springs. • Replace leaf spring. • Test spring functionality. • Observe safety precautions. • Clean, tools, equipment and work place.	Refitted leaf springs function as per manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Inspect leaf springs. • Replace defective leaf springs. • Test leaf springs. Principles: Students should explain the principles of construction and operation of suspension leaf springs. Theories: Students should explain: • Function of leaf springs. • Types of leaf	The following tools, equipment and safety gears are to be available: • Tool kit. • Service manual. • Jack. • Vehicle with steel springs. • Stop blocks/wedges. • Wire brush. • Greasing machine. • Hammer. • Drift/round punch. • Wheel spanner. • Puller.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				Store tools and equipment.		springs - Importance of leaf springs. - Importance of replacing leaf springs. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while replacing leaf springs. - Safe handling of work tools and equipment. - Waste disposal.	- Safety stand. - Safety boots. - Overall. - Gloves. Safety clear glasses.	
		(c) Refitting torsion bars	Discussion Guide students to describe concept of torsion bars Practical work Guide students on how to refit torsion bars Activity Organize students in	Students should be able to: - Select tools and equipment. - Identify defective torsion bars. - Replace torsional bars. - Test spring	Refitted torsion bars function as per manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Inspect torsion bars. - Replace defective torsion bars. - Test torsion bars. Principles: Students should explain the	The following tools, equipment and safety gears are to be available: - Tool kit. - Service manual. - Jack. - Vehicle with steel springs. - Stop blocks/wedges.	

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				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			manageable groups to refit torsion bars	functionality. - Observe safety precautions. - Clean, tools, equipment and work place. - Store tools and equipment.		principles of construction and operation of torsion bars. Theories: Students should explain: - Function of torsion bars. - Types of torsion bars. - Importance of torsion bars. - Importance of replacing torsion bars. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while refitting torsion bars. - Safe handling of work tools and equipment. - Waste disposal.	- Wire brush. - Greasing machine. - Hammer. - Drift/round punch. - Wheel spanner. - Puller. - Safety stand. - Safety boots. - Overall. - Gloves. - Safety clear glasses.	
5.0. Carry out engine maintenance	5.1. Performing engine non destruction tests	(a) Performing engine compression test.	Discussion Guide students to describe concept of engine	Students should be able to: Interpret service	Engine compression test conducted conforms to manufacturer'	Knowledge evidence: Detailed knowledge of: Method used:	The following tools, equipment and safety gears are to be available:	44

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				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			compression test Demonstration Demonstrate to students on how to perform engine compression test Activity Organize students in manageable groups to practice engine compression tests	manual. - Select tools and equipment. - Perform engine compression test. - Observe safety precautions. - Clean tools, equipment and workplace. - Store tools and equipment.	s specifications.	Students should explain how to: - Prepare engine for compression testing. - Perform engine compression test. Principles: Students should explain the principles of: - Performing engine non-destructive test Theories: Students should explain: - Function of engines. - Types of engines. - Engine components. - Importance of performing engine non-destructive tests. - Purpose of testing instruments. Circumstantial knowledge: Detailed knowledge about: - Safety	- Petrol engine and diesel engine (in running condition). - Petrol engine compression tester. - Diesel engine compression tester. - Spark plug spanner. - Engine analyzer. - Tool kit. - Data book/service manual. - Safety gears	

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				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						precautions while performing engine compression test • Safe handling of work tools and equipment. • Waste disposal.		
		(b) Performing cylinder leakage test	ICT based learning Guide students to read from internet about the concept of cylinder leakage test Demonstration Demonstrate to students on how to perform cylinder leakage test Hands on activity Organize students in manageable groups to perform the cylinder leakage test	Students should be able to: • Interpret service manual. • Select tools and equipment. • Perform cylinder leakage test. • Observe safety precautions. • Clean tools, equipment and work place. • Store tools and	Test conducted conforms to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Prepare engine for leakage testing. • Perform cylinder leakage test. Principles: Students should explain the principles of: • Engine construction and operation. • Performing engine non-destructive test. Theories: Students should explain: • Importance of	The following tools, equipment and safety gears are to be available: • Petrol engine and diesel engine (in running condition). • Petrol engine compression tester. • Diesel engine compression tester. • Spark plug spanner. • Engine analyzer. • Tool kit. • Data	

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				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			test.	equipment.		performing cylinder leakage tests. • Procedure for performing the cylinder leakage tests. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while performing the cylinder leakage tests. • Safe handling of work tools and equipment. • Waste disposal.	book/service manual. • Safety gears	
	5.2. Adjusting valve clearance	(a) Performing valve overlap adjustment method	Simulation Show students how to perform valve overlap adjustment method Practical work Guide students on how to Perform valve overlap adjustment	Students should be able to: • Select tools and equipment. • Perform valve overlap adjustment • Observe safety precaution	Adjusted valve clearance conforms to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to perform valve adjustment: • Valves overlap adjustment method. Principles: Students	The following tools, equipment and safety gears are to be available: • Vehicle/stationary engine. • Service manual. • Tool kit. • Micrometer. • Vernier	44

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				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			method Activity Organize students in manageable group to Perform valve overlap adjustment method	• s. Clean tools, equipment and work place. • Store tools and equipment.		should explain the principles of construction of valve train mechanism. Theories: Students should explain: • Effects of incorrect valve clearance on engine. • Piston pairs • Advantage of overhead camshaft engines compared to side cam shaft engines. • Reasons for some engines which need no valve clearance adjustment. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while adjusting valve clearance. • Safe handling of work tools and	• caliper. • Cam lifter. • Safety gear	

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				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						equipment. • Waste disposal.		
		(b) Performing one to one valve adjustment method.	Simulation Show students how to perform a one-to-one valve adjustment method. Practical work Guide students on perform one to one valve adjustment method Activity Organize students in manageable groups to perform one to one valve adjustment method	Students should be able to: • Select tools and equipment. • Perform one to one valve adjustment • Observe safety precautions. • Clean tools, equipment and work place. • Store tools and equipment.	Adjusted valve clearance conforms to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to perform valve adjustment: • One-to-one valve adjustment method. Principles: Students should explain the principles of construction of valve mechanism. Theories: Students should explain: • Importance of Perform one to one valve adjustment method. • Procedure for Perform one to one valve adjustment method. Circumstantial	The following tools, equipment and safety gears are to be available: • Vehicle/stationary engine. • Service manual. • Tool kit. • Micrometer. • Vernier caliper. • Cam lifter. • Overall. • Safety boots. • Gloves.	

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				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						knowledge: Detailed knowledge about: - Safety precautions while Perform one to one valve adjustment method. - Safe handling of work tools and equipment. - Waste disposal.		
	5.3. Carrying out ignition timing	(a) Performing spark ignition timing	Discussion Guide students to describe concept of spark ignition timing Practical work Guide students on how to, Perform spark ignition timing Activity Organize students in manageable group to Perform spark	Students should be able to: - Select tools and equipment. - Identify timing marks. - Perform ignition timing. - Test engine functionality. - Observe safety precaution	Ignition timing conforms to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Perform petrol engine ignition timing. Principles: Students should explain the principles of: - Operation of spark ignition engine. - Setting spark ignition timing. Theories: Students	The following tools, equipment and safety gears are to be available: - Vehicle/ petrol/diesel engine. - Timing torch for petrol/diesel engines. - Tool kit. - Service manual. - Container – (small) with a flexible pipe.	44

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			ignition timing	• s. Clean tools, equipment and work place. • Store tools and equipment.		should explain: • Petrol spark ignition system. • Effects of wrong timing. • Ignition timing process. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while performing ignition timing. • Safe handling of tools and equipment. • Waste disposal.	• Service lamp. • Wheel stoppers/wedges. • Safety gear	
		(b) Performing compression ignition timing.	Brainstorm Guide students to define compression ignition timing Practical work Guide students on how to perform compression ignition timing	Students should be able to: • Select tools and equipment. • Identify timing marks. • Perform compression ignition timing.	Compression ignition timing conforms to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Perform diesel engine injection timing. Principles: Students should explain the principles of:	The following tools, equipment and safety gears are to be available: • Vehicle/petrol/diesel engine. • Timing torch for petrol/diesel engines. • Tool kit.	

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				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Activity Organize students in manageable group to Perform compression ignition timing	- Test engine functionality. - Observe safety precautions. - Clean tools, equipment and work place. - Store tools and equipment.		- Combustion of compression ignition engine. - Setting compression ignition timing. Theories: Students should explain: - Diesel compression ignition system. - Effects of wrong timing. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while performing compression ignition timing - Safe handling of tools and equipment. - Waste disposal.	- Service manual. - Container – (small) with a flexible pipe. - Service lamp. - Wheel stoppers/wedges. - Safety gear	
6.0. Performing lathe machine operation	6.1. Performing turning	(a) Performing parallel turning	Brainstorm Guide students to define parallel turning Practical work	Students should be able to: Interpret technical drawings.	Machined work piece conforms to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should	The following tools, equipment and safety gears are to be available: Lathe	35

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				Process Assessment	Product/Services Assessment	Knowledge Assessment		
ons			Guide students on how to perform parallel turning Activity Organize students in manageable groups to perform parallel turning	• Select tools and equipment. • Select proper materials and tool. • Take measurements. • Cut the material to dimensions. • Select speed, feed and depth of cut. • Face work piece. • Perform parallel turning. • Observe safety precautions • Clean tools, equipment and work place		explain how parallel turning is performed. Principles: Students should explain the principles of: • Operation of lathe machine. Theories: Students should explain: • Main parts of a lathe machine. • Meaning of parallel turning, facing and centre drilling. • Measurements and machine elements. • Importance of applying coolant when turning. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while performing parallel turning. • Safe handling of work tools, equipment and	machine with accessories. • Centre drill. • Steel rule. • Scriber. • Hacksaw. • Power hacksaw. • Electrical power supply. • Vernier caliper. • Cotton gloves. • Cutting tools. • Depth gauge. • Safety gear	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				Store tools and equipment		work piece. Waste disposal.		
		(b) Performing taper turning	Brainstorm Guide students to define taper turning Practical work Guide students on how to perform taper turning Activity Organize students in manageable groups to perform taper turning	Students should be able to: - Interpret technical drawings. - Select tools and equipment. - Select proper materials and tools. - Take measurements. - Cut the material to dimensions. - Select speed, feed and depth of cut. - Face work piece. - Perform taper	Machined work piece conforms to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how taper turning is performed. Principles: Students should explain the principles of: - Perform taper turning Theories: Students should explain: - Important of taper turning - Procedure to follow when apply taper turning Circumstantial knowledge: Detailed knowledge about: - Safety precautions while performing	The following tools, equipment and safety gears are to be available: - Lathe machine with accessories. - Centre drill. - Steel rule. - Scriber. - Hacksaw. - Power hacksaw. - Electrical power supply. - Vernier caliper. - Cotton gloves. - Cutting tools. - Depth gauge. - Safety gear	

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				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				turning. - Observe safety precautions. - Clean tools, equipment and work place. - Store tools and equipment.		turning. - Safe handling of work tools, equipment and work piece. - Waste disposal.		
		(c) Performing knurling	Brainstorm Guide students to define knurling Practical work Guide students on how to Perform knurling Activity Organize students in manageable groups to Perform knurling	Students should be able to: - Interpret technical drawings. - Select tools and equipment. - Select proper materials and tool. - Take measurements. - Cut the material to	Machined work piece conforms to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how knurling is performed. Principles: Students should explain the principles of: - Holding work pieces on lathe machine. - Turning, facing and centre drilling. - Fits and	The following tools, equipment and safety gears are to be available: - Lathe machine with accessories. - Centre drill. - Steel rule. - Scriber. - Hacksaw. - Power hacksaw. - Electrical power supply.	

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				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				dimension s. - Select speed, feed and depth of cut. - Face work piece. - Center drill work piece. - Perform knurling. - Observe safety precaution s. - Clean tools, equipment and work place. - Store tools and equipment.		tolerances. - Perform knurling. Theories: Students should explain: - Important of knurling - Procedure to follow when perform knurling Circumstantial knowledge: Detailed knowledge about: - Safety precautions while performing knurling. - Safe handling of work tools, equipment and work piece. - Waste disposal.	- Vernier caliper. - Cotton gloves. - Cutting tools. - Depth gauge. - Safety gear	
	6.2. Performing thread cutting	(a) Performing external thread cutting	Brainstorm Guide students to define, external thread cutting	Students should be able to: Interpret technical drawings.	Work piece Threaded externally conforms to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should	The following tools, equipment and safety gears are to be available: Lathe	35

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				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Practical work Guide students on how to perform external thread cutting Activity Organize students in manageable group to perform external thread cutting	• Select tools and equipment. • Perform external thread cutting. • Observe safety precautions. • Clean tools, equipment and work place. • Store tools and equipment.		explain how external thread cutting is performed on lathe machine. Principles: Students should explain the principles of: • Cutting external thread cutting on lathe machines. • Sharpening external thread cutting tool. • Measuring external thread cutting diameters and pitch. • Calculating external thread cutting parameters. Theories: Students should explain: • Types of external thread cutting and their uses. • External thread parameters. • Difference between right hand and left hand threads.	machine with accessories. • Centre drill. • Vernier caliper. • Micrometer. • Steel rule. • Thread plug gauge. • Thread ring gauge. • Thread pitch gauge. • Depth gauge. • Hacksaw. • Power hacksaw. • Electrical power supply. • Safety gear	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						- Single threads and double threads. - Properties of different materials. - Tool geometry and its effects on chip formation. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while performing external thread cutting. - Safe handling of work tools, equipment and work piece. - Waste disposal.		
		(b) Performing internal thread cutting.	Brainstorm Guide students to define, internal thread cutting Practical work Guide students on how to	Students should be able to: - Interpret technical drawings. - Select tools and equipment.	Internal thread work piece conforms to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how internal thread is performed on lathe machine.	The following tools, equipment and safety gears are to be available: Lathe machine with accessories.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			perform internal thread cutting. Activity Organize students in manageable groups to perform internal thread cutting	• Perform internal thread • Observe safety precautions. • Clean tools, equipment and workplace • Store tools and equipment.		Principles: Students should explain the principles of: • Cutting internal thread on lathe machines. • Sharpening internal threading tool. • Measuring internal thread diameters and pitch. • Calculating internal thread parameters. Theories: Students should explain: • Types of internal thread and their uses. • Internal thread parameters. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while performing internal thread cutting.	• Centre drill. • Vernier caliper. • Micrometer. • Steel rule. • Thread plug gauge. • Thread ring gauge. • Thread pitch gauge. • Depth gauge. • Hacksaw. • Power hacksaw. • Electrical power supply. • Overall. • Safety boots. • Cotton gloves. • Safety clear glasses.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						- Safe handling of work tools, equipment and work piece. - Waste disposal.		
		(c) Performing imperial V-thread cutting.	Brainstorm Guide students in defining imperial V-thread cutting Practical work Guide students on how to perform imperial V-thread cutting. Activity Organize students in manageable group to perform imperial V-thread cutting	Students should be able to: - Interpret technical drawings. - Select tools and equipment. - Perform imperial V-thread cutting. - Observe safety precautions. - Clean tools, equipment and work place. - Store tools and equipment.	Threaded work piece conforms to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how imperial V-thread cutting is performed on lathe machine. Principles: Students should explain the principles of: - Cutting imperial V-thread on lathe machines. - Measuring imperial V-thread diameters and pitch. - Calculating imperial V-thread parameters. Theories: Students should explain: - Types of imperial	The following tools, equipment and safety gears are to be available: - Lathe machine with accessories. - Centre drill. - Vernier caliper. - Micrometer. - Steel rule. - Thread plug gauge. - Thread ring gauge. - Thread pitch gauge. - Depth gauge. - Hacksaw. - Power hacksaw.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						V-thread and their uses. - Imperial V-thread parameters. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while performing imperial V-thread cutting. - Safe handling of work tools, equipment and work piece. - Waste disposal.	- Electrical power supply. - Overall. - Safety boots. - Cotton gloves. - Safety clear glasses.	
	6.3. Performing boring	(a) Performing drilling	Brainstorm Guide students to define drilling Practical work Guide students on how to perform drilling Activity Organize students in	Students should be able to: - Interpret drawings. - Select tools and equipment. - Perform boring. - Deburr work piece.	Work piece drilled according to given technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how drilling is performed on lathe machine. Principles: Students should explain the principle of: Holding work	The following tools, equipment and safety gears are to be available: - Lathe machine with accessories. - Vernier caliper. - Depth gauge.	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	Product/Services Assessment	Knowledge Assessment		
			manageable group to perform drilling	- Observe safety precautions. - Clean tools and equipment. - Store tools and equipment.		piece on lathe machine. - Drilling work piece. - Taking accurate measurements. - Manual sharpening of cutting tools. Theories: Students should explain: - Important of drilling - Procedure to follow when drilling Circumstantial knowledge: Detailed knowledge about: - Safety requirements while drilling on lathe machine. - Safe handling of work tools, equipment and work piece. - Waste disposal.	- Centre drill. - Drill chuck. - Safety boots. - Cotton - Safety gear	
		(b) Performing reaming	Brainstorm Guide students to define	Students should be able to:	Work piece reamed according to	Knowledge evidence: Detailed knowledge	The following tools, equipment and safety gears	

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				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			reaming Practical work Guide students on how to perform reaming Activity Organize students in manageable group to perform reaming	• Interpret drawings. • Select tools and equipment. • Perform reaming • Deburr work piece. • Observe safety precautions. • Clean tools and equipment. • Store tools and equipment.	given technical specifications.	of: Method used: Students should explain how reaming is performed on lathe machine. Principles: Students should explain the principle of: • Reaming work piece. Theories: Students should explain: • Important of reaming • Procedure to follow when reaming • Importance of applying coolant when machining. Circumstantial knowledge: Detailed knowledge about: • Safety requirements while reaming on lathe machine. • Safe handling of work tools, equipment and	are to be available: • Lathe machine with accessories. • Vernier caliper. • Depth gauge. • Centre drill. • Drill chuck. • Safety boots. • Cotton gloves. • Safety clear glasses. • Cap/Helmet • Gloves. • Overall.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						work piece. • Waste disposal.		
7.0. Maintaining draught animal implements	7.1. Servicing draught animal implements	(a) Lubricating implement	Brainstorm Guide students to explain functions of lubricants Practical work Guide students on how to lubricate implement Activity Organize students in manageable groups to lubricate implements	Students should be able to: • Interpret drawings. • Select tools and materials. • Conduct inspection of implements. • Perform Lubrication implement • Observe safety. • Clean tools, equipment and work place. • Store tools and equipment.	Draught animal implements lubricated conform to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Perform lubrication of implement. Principles: Students should explain the principle of: • Perform lubrication of implement. Theories: Students should explain: • Draught animal implements. • Different types of animal drawn implements. • Explain the use of each implements • Adjustments required for each implement. • Farm operation	The following tools, equipment and safety gears are to be available: • Mould board ploughs. • Spike. • Spring tooth harrows. • Ridger. • Oil can. • Cart • Toolbar. • Yoke. • Service manual. • Tool kit. • Grease gun. • Welding machine. • Hand grinder. • Anvil. • Safety goggles. • Safety boots. • Gloves. • Overall	85

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						done by draught animals implements - Perform lubrication of implement - How to use draught animal. Circumstantial knowledge: Detailed knowledge about: - Safety requirements while perform lubrication of implement of draught animal implements. - Safe handling of working tools and equipment. - Waste disposal.		
		(b) Dismantling implements	Discussion Guide students to describe procedures for dismantling implements Practical work Guide students	Students should be able to: - Interpret drawings. - Select tools and materials. - Conduct	Dismantled draught animal implements conform to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: Dismantling implements.	The following tools, equipment and safety gears are to be available: - Mould board ploughs. - Spike. - Spring tooth	

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				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			on how to Dismantle implements Activity Organise students in manageable group to dismantle implements	inspection of implements. - Dismantle draught animals implements. - Observe safety. - Test implements with draught animal. - Clean tools, equipment and work place. - Store tools and equipment.		Principles: Students should explain the principle of: - Dismantling implements. Theories: Students should explain: - Procedure when Performing Dismantle implements Circumstantial knowledge: Detailed knowledge about: - Safety requirements while dismantling implements for draught animal implements. - Safe handling of working tools and equipment. - Waste disposal.	- harrows. - Ridger. - Oil can. - Cart - Toolbar. - Yoke. - Service manual. - Tool kit. - Grease gun. - Welding machine. - Hand grinder. - Anvil. - Safety goggles. - Safety boots. - Gloves. - Overall	
		(c) Assembling implements	Discussion Guide students to describe procedures for assembling implements	Students should be able to: - Interpret drawings. - Select tools and	Assembled draught animal implements conform to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to:	The following tools, equipment and safety gears are to be available: Mould board ploughs.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Practical work Guide students on how to assemble implements Activity Organize students in manageable groups to assemble implements	materials. - Conduct inspection of implements. - Assemble draught animal implements. - Observe safety. - Clean tools, equipment and work place. - Store tools and equipment.		- Assemble implements Principles: Students should explain the principle of: - Conducting adjustment on animal drawn. Implements. - Assemble implements. Theories: Students should explain: - Important of assemble implements. - Procedure to follow when assemble implements Circumstantial knowledge: Detailed knowledge about: - Safety requirements while performing assemble of animal implements. - Safe handling of working tools	- Spike. - Spring tooth harrows. - Ridger. - Oil can. - Cart - Toolbar. - Yoke. - Service manual. - Tool kit. - Grease gun. - Welding machine. - Hand grinder. - Anvil. - Safety goggles. - Safety boots. - Gloves. - Overall	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						and equipment. • Waste disposal.		
		(d) Repairing cats	Discussion Guide students to describe concept of cat Practical work Guide students on how to repair cats Activity Organize students in manageable group to repair cats	Students should be able to: • Interpret drawings. • Select tools and materials. • Conduct inspection of implements. • Repair cats. • Perform relevant adjustments on implements. • Observe safety. • Test implements with draught animal. • Clean tools,	Cats Repaired conform to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Repair cats Principles: Students should explain the principle of: • Repair cats. Theories: Students should explain: • Important of repair cats. • Procedure to follow when repair cats. Circumstantial knowledge: Detailed knowledge about: • Safety requirements while performing repair of cats of draught animal • Safe handling of working tools	The following tools, equipment and safety gears are to be available: • Mould board ploughs. • Spike. • Spring tooth harrows. • Ridger. • Oil can. • Cart • Toolbar. • Yoke. • Service manual. • Tool kit. • Grease gun. • Welding machine. • Hand grinder. • Anvil. • Safety goggles. • Safety boots. • Gloves. • Overall	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				equipment and work place. • Store tools and equipment.		and equipment. • Waste disposal.		
	7.2. Servicing draught animal planters	(a) Servicing end wheel planter	Brainstorm Guide students to describe end wheel planter Practical work Guide students on how to service end wheel planter Activity Organize students in manageable group to service end wheel planter	Students should be able to: • Select tools and materials. • Inspect the end wheel planter. • Dismantle the end wheel planter. • Identify defects of end wheel planter. • Service the end wheel planter. • Assemble end wheel planter units. • Perform	Draught animal end wheel planter serviced as per technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Attain seed spacing on end wheel planter. • Attain required quantity of fertilizer. • Attain depth of seed placement. • Service end wheel planter. Principles: Students should explain the principle of: • Gear and replacement. • Attaining seed spacing. • Attaining seed	The following tools, equipment and safety gears are to be available: • Draught animal planter. • Direct seeder. • Fertilizer hopper. • Furrow opener. • Tool kit. • Oil can. • Grease gun. • Service manual. • Welding machine. • Power supply. • Hand	65

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				final adjustment s. - Observe safety precaution s. - Test the end wheel planter - Clean tools, equipment and work place - Store tools and planter.		depth control. - Servicing planters. Theories: Students should: - Describe the end wheel planter. - Outline different types of end wheel planter. - Describe quality of planting machine parts. - Explain how to use end wheel planter. - Describe maintenance procedure of end wheel planter. Circumstantial knowledge: Detailed knowledge about: - Safety requirements while performing service of draught animal end wheel planter. - Safe handling of	grinder. - Anvil. - Safety boots. - Safety goggles. - Gloves.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						working tools and equipment. • Waste disposal.		
		(b) Servicing press wheel planters	Brainstorm Guide students to define press wheel planters Practical work Guide students on how to Service press wheel planters Activity Organize students in manageable group to service press wheel planters	Students should be able to: • Select tools and materials. • Inspect the press wheel planter. • Dismantle the press wheel planter. • Identify defects of press wheel planter. • Service the press wheel planter • Assemble press wheel planter units. • Perform	Draught animal press wheel planter serviced as per technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Attain seed spacing on press wheel planter. • Attain required quantity of fertilizer on press wheel planter. • Attain depth of seed placement on press wheel planter. • Service press wheel planter. Principles: Students should explain the principle of: • Gear and replacement on press wheel planter. • Attaining seed spacing on press	The following tools, equipment and safety gears are to be available: • Draught animal planter. • Direct seeder. • Fertilizer hopper. • Furrow opener. • Tool kit. • Oil can. • Grease gun. • Service manual. • Welding machine. • Power supply. • Hand grinder. • Anvil. • Safety boots. • Safety	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				final adjustments. - Observe safety precautions. - Test the planter. - Clean tools, equipment and work place - Store tools and planter.		wheel planter. - Attaining seed depth control on press wheel planter. - Servicing press wheel planter. Theories: Students should: - Describe the press wheel planter. - Outline different types of press wheel planter. - Describe quality of planting machine parts. - Explain how to use press wheel planter. - Describe maintenance procedure of press wheel planter. Circumstantial knowledge: Detailed knowledge about: - Safety requirements	- Goggles. - Gloves.	

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				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						while performing service of draught animal press wheel planter. • Safe handling of working tools and equipment. • Waste disposal.		
		(c) Carrying out relevant adjustments on planters	Brainstorm Guide students to describe adjustments that are carried out in planters Practical work Guide students on how to carry out relevant adjustments on planters. Activity Organize students in manageable groups to carry out relevant adjustments on planters	Students should be able to: • Select tools and materials. • Inspect the planter. • Perform final adjustments. • Observe safety precautions. • Test the planter. • Clean tools, equipment and work place	Draught animal planter adjusted as per technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Adjust gear system on end and press wheel planter Principles: Students should explain the principle of: • Adjust gear system on end and press wheel planter Theories: Students should: • Important of Carry out relevant	The following tools, equipment and safety gears are to be available: • Draught animal planter. • Direct seeder. • Fertilizer hopper. • Furrow opener. • Tool kit. • Oil can. • Grease gun. • Service manual. • Welding machine. • Power	

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				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				Store tools and planter.		adjustments on planters - Procedure for Carry out relevant adjustments on planters Circumstantial knowledge: Detailed knowledge about: - Safety requirements while Important of Carry out relevant adjustments on planters - Safe handling of working tools and equipment. - Waste disposal.	supply. - Hand grinder. - Anvil. - Safety boots. - Safety goggles. - Gloves.	
8.0. Maintaining grass cutting machines	8.1. Servicing forage harvesters	(d) Servicing reciprocating (Cutter bar) mower/racers.	Brainstorm Guide students to define reciprocating (Cutter bar) mower/racers Practical work Guide students on how to	Students should be able to: - Select tools, equipment and safety gears. - Perform Servicing	A serviced reciprocating (Cutter bar) mower/racer conforms to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain reciprocating (Cutter bar) mower/racer dismantling and	The following tools, equipment and safety gears are to be available: - Windrowers. - Reciprocating (cutter bar) mower/windrowers.	75

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			Service reciprocating (Cutter bar) mower/racers Activity Organize students in manageable group to service reciprocating (Cutter bar) mower/racers in school premises	of reciprocating (Cutter bar) mower/racers. - Observe safety precautions. - Test forage harvesters. - Clean tools and equipment. - Store tools and equipment.		servicing. Principles: Students should explain the principle of: - Dismantling and reciprocating (Cutter bar) mower/racer - Lubrication - Connecting to P.T.O. Theories: Students should explain: - Types of reciprocating (Cutter bar) mower/racer - Components of reciprocating (Cutter bar) mower/racer - Angular motion characteristics / linear motion. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while performing the task.	- Rotary mower / windrowers. - Tool kit. - Grease gun. - Service manual. - Trolley jack. - Welding machine. - Overall. - Safety glasses. - Gloves. - Safety boots.	

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				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						- Safe handling of working tools and equipment. - Waste disposal.		
		(e) Servicing rotary mower / racers	Brainstorm Guide students to define rotary mower / racers Practical work Guide students on how to Service rotary mower / racers Activity Organize students in manageable group to service rotary mower / racers	Students should be able to: - Select tools, equipment and safety gears. - Inspect rotary mower / racers. - Dismantle rotary mower / racers. - Service rotary mower / racers. - Replace defected parts. - Assemble rotary mower / racers. - Observe	A serviced rotary mower / racers conforms to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain rotary mower / racers dismantling and servicing. Principles: Students should explain the principle of: - Dismantling and servicing rotary mower / racers - Lubrication - Connecting to P.T.O. Theories: Students should explain: - Type's rotary mower / racers. - Components of rotary mower / racers. - Angular motion characteristics / linear motion of	The following tools, equipment and safety gears are to be available: - Windrowers - Reciprocating (cutter bar) mower/windrowers. - Rotary mower / windrowers - Tool kit. - Grease gun. - Service manual. - Trolley jack. - Welding machine. - Overall. - Safety glasses. - Gloves. - Safety boots.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				safety precautions. • Test forage harvesters. • Clean tools and equipment. • Store tools and equipment.		rotary mower / racers. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while performing the task. - Safe handling of working tools and equipment. - Waste disposal.		
		(f) Carrying out relevant adjustment.	Brainstorm Guide students to define terms Practical work Guide students on how to carry out relevant adjustment Activity Organize students in manageable group to carry out relevant adjustment	Students should be able to: - Select tools, equipment and safety gears. - Inspect forage harvesters. - Carry out relevant adjustment - Observe safety precautions.	A serviced forage harvester conforms to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain steps in Carry out relevant adjustment. Principles: Students should explain the principle of: - Carry out relevant adjustment. Theories: Students should explain: - Important of	The following tools, equipment and safety gears are to be available: - Windrowers. - Reciprocating (cutter bar) mower/windrowers. - Rotary mower / windrowers. - Tool kit. - Grease gun. - Service manual. - Trolley jack.	

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				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				• Test forage harvesters. • Clean tools and equipment • Store tools and equipment.		carry out relevant adjustment of planter. • Procedure for carry out relevant adjustment of planter. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while performing the task. • Safe handling of working tools and equipment. • Waste disposal.	• Welding machine. • Overall. • Safety glasses. • Gloves. • Safety boots.	
	8.2. Servicing balling machines	(g) Servicing round balling machine	Brainstorm Guide students to define round balling machine Practical work Guide students on how to Service round balling machine Activity Organize	Students should be able to: • Interpret drawings. • Select tools and material. • Inspect the round balling machine • Separate	Round balling machines serviced according to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Dismantle round balling machines. • Service round balling machines. • Assembling round balling	The following tools, equipment and safety gears are to be available: • Round balling machines. • Square balling machines. • Tool kit. • Service	75

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				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			students in manageable group to service round balling machine	prime mover and round balling machine. - Dismantle round balling machine. - Service round balling machine. - Assemble round balling machine. - Test round balling machine. - Observe safety precautions. - Clean tools, equipment and work place. - Store tools and equipment.		machines. Principles: Students should explain the principles of: - Round balling machine operations. - Dismantling, servicing and assembling round balling machines. - Connecting to P.T.O Theories: Students should explain: - Types of round balling machines. - Function of machine components. - Angular and linear motion characteristics. - Force and energy in the machine. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while servicing round	manual. - Jack. - Overall. - Lifting machine. - Grease pump. - Oil can. - Power supply. - Welding machine. - Safety boots. - Gloves. - Overall. - Safety goggles. - Helmet. - Air compressor.	

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				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						balling • Safe handling of working tools and equipment. • Waste disposal.		
		(h) Servicing square balling machine	Brainstorm Guide students to define square balling Practical work Guide students on how to Service square balling machine. Activity Organize students in manageable group to service square balling	Students should be able to: • Interpret drawings. • Select tools and material. • Inspect the square balling machine • Separate prime mover and square balling machine. • Dismantle square balling machine. • Service square balling machine. • Assemble	Square balling machines serviced according to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Dismantle square balling machines. • Service square balling machines. • Assembling square balling machines. Principles: Students should explain the principles of: • Square balling machine operations. • Dismantling, servicing and assembling square balling machines. • Connecting to P.T.O.	The following tools, equipment and safety gears are to be available: • Round balling machines. • Square balling machines. • Tool kit. • Service manual. • Jack. • Overall. • Lifting machine. • Grease pump. • Oil can. • Power supply. • Welding machine. • Safety boots.	

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				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				square balling machine. • Test square balling machine. • Observe safety precautions. • Clean tools, equipment and work place. • Store tools and equipment.		• Adjustments on square balling machines. Theories: Students should explain: • Types of square balling machines. • Function of machine components. • Angular and linear motion characteristics. • Force and energy in the machine. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while servicing square balling machine • Safe handling of working tools and equipment. • Waste disposal.	• Gloves. • Overall. • Safety goggles. • Helmet. • Air compressor.	
		(i) Carrying out relevant adjustment	Brainstorm Guide students to define terms Practical work	Students should be able to: • Interpret drawings.	Balling machines adjusted according to technical	Knowledge evidence: Detailed knowledge of: Method used:	The following tools, equipment and safety gears are to be available:	

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				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Guide students on how to carry out relevant adjustment Activity Organize students in manageable groups to carry out relevant adjustment	- Select tools and material. - Inspect the balling machine - Perform final adjustment s. - Test balling machine. - Observe safety precautions. - Clean tools, equipment and work place. - Store tools and equipment.	specifications.	Students should explain how to: - Adjust balling machines. Principles: Students should explain the principles of: - Adjustments on balling machines. Theories: Students should explain: - How to adjust the machine parts. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while servicing forage harvesters. - Safe handling of working tools and equipment. - Waste disposal.	- Round balling machines. - Square balling machines. - Tool kit. - Service manual. - Jack. - Overall. - Lifting machine. - Grease pump. - Oil can. - Power supply. - Welding machine. - Safety boots. - Gloves. - Overall. - Safety goggles. - Helmet. - Air compressor.	
9.0. Performing	9.1. Performing basic principle of	(a) Performing basic soil	Discussion Guide students	Students should be able	Soil characteristics	Knowledge evidence:	The following tools, equipment	75

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
crop production and farm machinery operation	crop production	characteristics analysis.	to define essential soil terms Practical work Guide students on how to Perform basic soil characteristics analysis. Activity Organize students in manageable group to perform basic soil characteristics analysis	to: • Select tools and materials. • Perform basic soil characteristics analysis. • Collect soil samples for analysis • Perform final adjustments of soil tester. • Test soil • Observe safety precautions. • Clean tools, equipment and work place. • Store tools and equipment.	analysed according to technical specifications	Detailed knowledge of: Method used: Students should explain how to: • Texture Analysis • Soil pH Testing • Moisture Content of soil • Organic Matter Content • Nutrient Analysis • Drainage and Porosity • Salinity Testing Principles: Students should explain the principles of: • Soil test procedure. • Adjustments of soil tester equipment's. Theories: Students should explain: • Describe soil physical properties. • Classify soil physical and chemical properties using	and safety gears are to be available: • Tool kit. • Soil tester • Hand sickle • Shovel • Spade • Axe • Agriculture input • Hoe • Fork • Safety boots. • Gloves. • Overall. • 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	Product/Services Assessment	Knowledge Assessment		
						different methods. • Describe different methods used to control erosion • Describe types of soil erosion and their causes. • Describe the procedure for collect soil samples for analysis • Explain the importance of soil texture and its role in crop growth. • Describe the relationship between pH levels and nutrient availability. • Describe the method and importance of organic matter analysis. • Discuss the causes, effects,		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						and solutions related to soil compaction. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while performing basic soil characteristics analysis. - Safe handling of working tools and equipment. - Waste disposal		
		(b) Performing principle of crop production.	Brainstorm Guide students to describe concept of crop production Practical work Guide students on how to Perform the principle of crop production Activity Organize	Students should be able to: - Select tools and material. - Apply principles of crop production to optimize production - Describe crop	Crop production performed according to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Dismantle tools and equipment's. - Principle of crop production Principles: Students should explain the principles of: - Crop planting	The following tools, equipment and safety gears are to be available: - Tool kit. - Soil tester - Hand sickle - Shovel - Spade - Hoe - Fork - Safety	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			students in manageable groups to perform the principle of crop production	planting requirements • Observe safety precautions. • Clean tools, equipment and work place. • Store tools and equipment.		procedure Theories: Students should explain: • Define crop rotation and its advantages, • Explain crop rotation contributes to soil fertility and pest management. • Explain the process of photosynthesis, mention the key factors that influence it • Describe how photosynthesis affects crop growth. • Explain the role of organic matter in soil fertility, mention its components • Explain the importance of irrigation in crop production • Explain the concept of	gears	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						sustainable farming practices - Explain the importance of soil drainage Circumstantial knowledge: Detailed knowledge about: - Safety precautions while perform crop production. - Safe handling of working tools and equipment. - Waste disposal		
	9.2.Performing agricultural machines driving	(a) Operating agricultural machines	Demonstration Guide students to perform pre operation checks Practical work Guide students on how to Operate agricultural machines Activity Organize	Students should be able to: - Interpret technical drawings. - Use service manuals. - Select tools and equipment. - Carry out pre-operation	Agriculture machinery operated according to principle of driving	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Operate agricultural machinery. - Conduct pre-operational checks. - Take on machine's	The following tools, equipment and safety gears are to be available: - Tractor. - Powertiller - Tool kit. - Wheel spanners. - Jack. - Oil can. - Grease pump.	75

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			students in manageable group to operate agricultural machines	checks. - Observe safety precautions. - Start and stop the engine. - Drive machinery forward and backward - Stop the machinery. - Interpret road signs. - Hitch at single- and three-point linkage. - Observe safety precautions. - Clean tools - Store tools and equipment.		preventive maintenance. Principles: Students should explain the principles of: - Operating agricultural machinery. - Servicing agricultural machinery Theories: Students should explain: - Describe procedure for machinery driving. - Explain importance of preventive maintenance on agricultural machines. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while operating agricultural machinery.	- Funnel. - Hydrometer - Service manuals. - Stethoscope. - Helmet. - Overall. - Tape measure. - Safety clear glasses. - Gloves - Safety boots.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						• Safe handling of working tools and equipment. • Waste disposal.		
10.0. Project	10.1. Project							150

Form Three

Table 5: Detailed Contents for Form Three

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
1.0 Overhauling Engines	1.1 Dismantling Engines	(a) Dismantling cylinder head.	Discussion Guide students to define terms, identify parts of an engine, analyze functions of each part Demonstration Demonstrate to students on how to dismantle cylinder head Activity Organize students in manageable group to dismantle cylinder head	Students should be able to: • Select tools and equipment • Dismantle cylinder head. • Clean parts. • Observe safety precautions. • Clean tools and work place. • Store tools, parts and equipment.	Cylinder head dismantled according to manufacturer's service manual.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Dismantle cylinder head. Principles: Students should explain the principle of: • Construction of cylinder head Theories: Students should explain: • Components parts of cylinder head • Functions of cylinder head. • Engine systems. • Importance of service manuals. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while performing cylinder head dismantling.	The following tools, equipment and safety gears are to be available: • Tool kit. • Chain block. • Adjustable engine stand. • Engine assembly. • Wire brush. • Service manual. • Hand gloves. • Safety clear glass • Safety boots. • Overall.	26

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
						- Safe handling of work tools, equipment and parts. - Waste disposal.		
		(b) Dismantling oil sump	Discussion Guide students to define, Identify function of oil sump. Demonstration Lead students on how to dismantle oil sump Practical Organize students in manageable group to practice dismantling oil sump	Students should be able to: - Select tools and equipment - Detach oil sump. - Clean parts. - Observe safety precautions. - Clean tools and work place. - Store tools, parts and equipment.	Oil sump dismantled according to manufacturer's service manual.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Dismantle oil sump. Principles: Students should explain the principle of: - Dismantling oil sump. Theories: Students should explain: - Functions of oil sump - Importance of service manuals. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while performing oil sump dismantling. - Safe handling of	The following tools, equipment and safety gears are to be available: - Tool kit. - Chain block. - Adjustable engine stand. - Engine assembly. - Wire brush. - Service manual. - Hand gloves. - Safety clear glass - Safety boots. - Overall.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
						work tools, equipment and parts. • Waste disposal.		
		(c) Dismantling cylinder block	Discussion Guide students to define terms, identify function of cylinder block. Demonstration Lead students on how to dismantle cylinder block. Activity Organize students in manageable group to practice dismantling cylinder block.	Students should be able to: • Select tools and equipment • Dismantle cylinder block. • Clean parts. • Observe safety precautions. • Clean tools and work place. • Store tools, parts and equipment.	Cylinder block dismantled according to manufacturer's service manual.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Dismantle cylinder block. • Clean parts. Principles: Students should explain the principle of: • Dismantling cylinder block. Theories: Students should explain: • Functions of cylinder block • Importance of service manuals. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while dismantling cylinder block • Safe handling of work tools, equipment and	The following tools, equipment and safety gears are to be available: • Tool kit. • Chain block. • Adjustable engine stand. • Engine assembly. • Wire brush. • Service manual. • Hand gloves. • Safety clear glass • Safety boots. • Overall.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
						parts. • Waste disposal.		
	1.2 Servicing Cylinder Heads	(a) Refacing cylinder head.	Brainstorm Guide students to define, Identify importance of refacing cylinder head. Practical work Guide students on how to reface cylinder head Activity Organize students in manageable group to reface cylinder head.	Students should be able to: • Select tools and equipment • Clean parts. • Inspect for wear and bends. • Reface cylinder head. • Observe safety precautions. • Clean tools and work place. • Store tools and equipment.	Refaced cylinder head conforms to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Check cylinder head warpage. Principles: Students should explain the principle of: • Taking measurements of cylinder head. Theories: Students should explain: • Function of cylinder head components and their materials. • Defects of cylinder heads and their causes. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while refacing cylinder head. • Safe handling of work tools and	The following tools, equipment and safety gears are to be available: • Straight edge bar. • Feeler gauge. • Torque wrench. • Valve seat cutting machine. • Wire brush. • Cylinder head assembly • Valve. • Tri-square • Bevel protractor • Valve spring lifter • Tool kit. • Spark plug spanner. • Dial gauge. • Surface plate / gauge. • Vernier	26

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
						equipment Waste disposal.	calliper. - Service manual. - Air compressor. - Oil can. - Gloves. - Safety clear glass. - Safety boots. - Overalls.	
		(b) Performing valve lapping	Discussion Lead students to define terms, Identify importance of performing valve lapping Demonstration Guide students on how to Perform valve lapping. Activity Organize students in manageable group to Perform valve lapping.	Students should be able to: - Select tools and equipment - Clean parts. - Inspect for wear and bends. - Perform valve lapping. - Observe safety precautions. - Clean tools and work	Valve lapping conforms to manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Perform valve lapping. Principles: Students should explain the principle of: Performing valve lapping. should explain: - Function of valve - Valve seats and angles. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while performing	The following tools, equipment and safety gears are to be available: - Straight edge bar. - Feeler gauge. - Torque wrench. - Valve seat cutting machine. - Wire brush. - Cylinder head assembly - Valve. - Tri-square - Bevel protractor	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
				place. • Store tools and equipment.		valve lapping. • Safe handling of work tools and equipment • Waste disposal.	• Valve spring lifter • Tool kit. • Spark plug spanner. • Surface plate / gauge. • Vernier caliper. • Lapping stick. • Service manual. • Air compressor. • Oil can. • Gloves. • Safety clear glass. • Safety boots. • Overalls	
		(c) Assembling cylinder head	Question and answer Guide students to define terms, identify procedures for assembling cylinder head Practical work	Students should be able to: • Select tools and equipment • Clean parts. • Inspect for wear and	Cylinder head assembled conforms to manufacturer's specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain: • Procedures for assembling cylinder head Principles: Students should explain the principle of:	The following tools, equipment and safety gears are to be available: • Straight edge bar. • Feeler gauge. • Torque wrench.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			Guide students on how to assemble cylinder head Activity Organize students in manageable group to practice assembling cylinder head	bends. - Assemble cylinder head. - Observe safety precautions. - Test for valve leakage. - Clean tools and work place. - Store tools and equipment.		- Taking measurements of cylinder head. Theories: Students should explain: - Sequence of tightening cylinder head bolts/nuts. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while assembling cylinder head. - Safe handling of work tools and equipment - Waste disposal.	- Valve seat cutting machine. - Wire brush. - Cylinder head assembly - Valve. - Tri-square - Bevel protractor - Valve spring lifter - Tool kit. - Spark plug spanner. - Hand drill machine. - Dial gauge. - Surface plate / gauge. - Vernier caliper. - Grinding paste. - Lapping stick. - Service manual. - Air compressor. - Oil can.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
							- Gloves. - Safety clear glass. - Safety boots. - Overalls.	
	1.3 Performing Cylinder Block Measurements	(a) Checking cylinder block warpage	Demonstration Guide students to define terms, identify causes of cylinder block warpage Practical work Guide students on how to check cylinder block warpage Activity Organize students in manageable group to check cylinder block warpage	Students should be able to: - Select tools and equipment - Clean cylinder block. - Identify warped point on cylinder block surface. - Check cylinder block warpage - Interpret measurements. - Observe safety precautions. - Clean	Cylinder block warpage Checked according to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Check cylinder block warpage. Principles: Students should explain the principle of: - Reboring or sleeving cylinder. Theories: Students should explain: - Importance of checking cylinder block warpage. - Causes of cylinder block warpage, cylinder bore wear. - Tools used to check cylinder block surface warpage Circumstantial knowledge: Detailed knowledge about: - Safety precautions	The following tools, equipment and safety gears are to be available: - Work bench. - Engine block. - Straight edge. - Feeler gauge. - Internal micrometer. - Vernier caliper. - Surface grinder. - Arbor. - Line boring machine. - Service manual. - Safety boots. - Overall.	26

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
				tools, equipment and work place. • Store tools, equipment and parts.		while Check cylinder block warpage. • Safe handling of measuring tools, equipment and parts. • Waste disposal.		
		(b) Performing cylinder bore measurements	Brainstorm Guide students to define terms, identify procedures for performing cylinder bore measurement Practical work Guide students on how to perform cylinder bore measurement Activity Organize students in manageable group to perform cylinder bore measurement	Students should be able to: • Select tools and equipment • Clean cylinder block. • Perform cylinder bore measurements • Check cylinder bore wear. • Observe safety precautions. • Clean tools, equipment	Cylinder bore measurement performed according to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: Perform cylinder bore measurements Principles: Students should explain the principle of: • Performing cylinder bore measurement Theories: Students should explain: • Importance of performing cylinder bore measurement • Causes of cylinder bore and wear. Circumstantial knowledge: Detailed knowledge about: • Safety precautions	The following tools, equipment and safety gears are to be available: • Work bench. • Engine block. • Straight edge. • Feeler gauge. • Internal micrometer. • Cylinder bore gauge and attachments. • Vernier caliper. • Surface grinder. • Line boring machine. • Service manual. • Safety boots.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
				and work place. • Store tools, equipment and parts.		while performing cylinder block measurements. • Safe handling of measuring tools, equipment and parts. • Waste disposal.	• Overall.	
		(c) Checking camshaft journal bores	Brainstorm Guide students to define terms, Identify procedures for Checking camshaft journal bores Practical work Guide students on how to Check camshaft journal bores Activity Organize students in manageable group to check camshaft journal bores	Students should be able to: • Select tools and equipment • Check camshaft journal bore • Observe safety precautions • Clean tools, equipment and work place • Store tools, equipment and parts.	Camshaft journal bores Checked according to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Check camshaft journal bore for wear. Principles: Students should explain the principle of: • Construction of camshaft. Theories: Students should explain: • Importance of checking camshaft journal bores Circumstantial knowledge: Detailed knowledge about: • Safety precautions while checking camshaft journal	The following tools, equipment and safety gears are to be available: • Work bench. • Engine block. • Straight edge. • Feeler gauge. • Internal micrometer. • Cylinder bore gauge and attachments. • Telescopic gauge. • Vernier caliper. • Surface grinder. • Line boring machine. • Service	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
						bores. - Safe handling of measuring tools, equipment and parts. - Waste disposal.	- manual. - Safety boots. - Overall.	
	1.4 Performing Crankshaft Measurements	(a) Checking bearing oil clearance	Brainstorm Guide students to define terms, identify function of bearing Practical work Guide students on how to Check bearing oil clearance Activity Organize students in manageable group to Check bearing oil clearance	Students should be able to: - Select tools and equipment - Check bearing oil clearance. - Observe safety precautions. - Clean tools, equipment, parts and work place. - Store tools and equipment.	Bearing oil clearance checked as per technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Check bearing oil clearance Principles: Students should explain the principle of: - Tightening main bearing caps. Theories: Students should explain: - Procedures for Checking bearing oil clearance - Importance of Checking bearing oil clearance - Sizes of bearings. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while performing	The following tools, equipment and safety gears are to be available: - Tool kit. - Micrometer. - Torque wrench. - Feeler gauge. - Dial gauge. - Cylinder block. - Crankshaft. - Connecting rod. - Vee-blocks. - Service manual. - Cranks shaft grinding machine - Gloves - Safety glass.	28

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
						crankshaft measurements. • Safe handling of work tools, equipment and parts. • Waste disposal.	• Overall. • Safety boots.	
		(b) Checking crankshaft straightness for	Brainstorm Guide students to define, identify function of crankshaft Practical work Guide students on how to Check for crankshaft straightness Activity Organize students in manageable group to Check for crankshaft straightness	Students should be able to: • Select tools and equipment • Clean crankshaft • Check crankshaft weights (webs). • Check for crankshaft straightness • Tighten main bearing caps. • Observe safety precautions. • Clean	Crankshaft measurements done as per technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to • Measure crankshaft straightness. Principles: Students should explain the principle of • Taking crankshaft measurements. • Tightening main bearing caps. Theories: Students should explain: • Function of crankshaft • Importance of Checking crankshaft straightness Circumstantial knowledge: Detailed knowledge about:	The following tools, equipment and safety gears are to be available: • Tool kit. • Micrometer. • Torque wrench. • Feeler gauge. • Dial gauge. • Cylinder block. • Crankshaft. • Connecting rod. • Vee-blocks. • Service manual. • Crankshaft grinding machine • Gloves • Safety glass.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
				tools, equipment, parts and work place. • Store tools and equipment.		• Safety precautions while performing crankshaft measurements. • Safe handling of work tools, equipment and parts. • Waste disposal.	• Overall. • Safety boots.	
		(c) Checking crankshaft journals.	Demonstration Guide students to define, Identify function of crankshaft journals. Practical work Guide students on how to Check crankshaft journals. Activity Organize students in manageable group to check crankshaft journals.	Students should be able to: • Select tools and equipment • Clean crankshaft • Check crankshaft journals • Observe safety precautions. • Clean tools, equipment, parts and work place. • Store tools and	Crankshaft journal checked as per technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Check crankshaft journal. Principles: Students should explain the principle of: Inspecting the crankshaft. Theories: Students should explain: • Function of crankshaft journals • Sizes of bearings. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while performing crankshaft	The following tools, equipment and safety gears are to be available: • Tool kit. • Micrometer. • Torque wrench. • Feeler gauge. • Dial gauge. • Cylinder block. • Crankshaft. • Connecting rod. • Vee-blocks. • Service manual. • Gloves • Safety glass. • Overall.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
				equipment.		measurements. • Safe handling of work tools, equipment and parts. • Waste disposal.	• Safety boots.	
	1.5 Performing Camshaft Measurements	(a) Checking camshaft for wear.	Demonstration Guide students to define terms, Identify function of Camshaft Practical work Guide students on how to Check camshaft for wear Activity Organize students in manageable group to check camshaft for wear	Students should be able to: • Select tools and equipment • Dismantle camshaft • Clean parts. • Measure for wear. • Observe safety precautions. • Clean tools, equipment and work place. • Store tools and equipment.	Checked camshaft conforms to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Remove camshaft from the engine. • Measure for wear. Principles: Students should explain the principles of: • Construction of camshaft. • Taking measurements on camshaft. • Handling camshaft bushes or housings. Theories: Students should explain: • Purpose of camshaft. • Camshaft measurements. • Storage of camshaft. • Importance of	The following tools, equipment and safety gears are to be available: • Diesel or petrol engine camshaft. • Service manual. • Valve lifter. • Dial gauge. • V-Blocks. • Work bench. • Micrometer. • Tool kit. • Overall. • Safety boot. • Gloves.	21

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
						service manuals. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while performing camshaft measurements. - Safe handling of work tools and equipment. - Waste disposal.		
		(b) Check camshaft straightness	Brainstorm Guide students to define, Identify procedures for Checking camshaft straightness Practical work Guide students on how to Check camshaft straightness Activity Organize students in manageable	Students should be able to: - Select tools and equipment - Dismantle camshaft - Clean parts. - Measure for wear - Check camshaft straightness - Observe safety precaution	Camshaft straightness conforms to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Remove camshaft from the engine. Principles: Students should explain the principles of: - Taking measurements on camshaft. Theories: Students should explain: - Purpose of camshaft. - Importance of service manuals. Circumstantial	The following tools, equipment and safety gears are to be available: - Diesel or petrol engine camshaft. - Service manual. - Valve lifter. - Dial gauge. - V-Blocks. - Work bench. - Micrometer. - Tool kit. - Overall. - Safety boot.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			group to Check camshaft straightness	s. Clean tools, equipment and work place. - Store tools and equipment.		knowledge: Detailed knowledge about: - Safety precautions while performing camshaft measurements. - Safe handling of work tools and equipment. - Waste disposal.	Gloves.	
	1.6 Checking Connecting Rods	(a) Checking condition of connecting rod.	Brainstorm Guide students to define, Identify function of Connecting rods Practical work Guide students on how to Check condition of connecting rod Activity Organize students in manageable group to Check condition of	Students should be able to: - Select tools and equipment - Detach connecting rod. - Clean connecting rod. - Check connecting rod for overheating, damage or wear. - Check connecting rod for	Checked connecting rod conforms to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Check connecting rod for bend and twist. Principles: Students should explain the principles of: - Construction of connecting rod. Theories: Students should explain: - Importance of checking connecting rod alignment. Circumstantial knowledge: Detailed knowledge	The following tools, equipment and safety gears are to be available: - Connecting rod jig. - Surface plate. - Work bench. - Dial gauges. - Telescopic gauge. - Inside and outside micrometer. - Thin wire. - Hammer. - Service manual. - Hydraulic	21

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			connecting rod	deformation. - Observe safety precautions - Clean tools, equipment and work place. - Store tools, equipment and parts.		about: - Safety precautions while checking connecting rods. - Safe handling of work tools and equipment. - Waste disposal.	press. - Overall. - Safety glasses. - Safety boots. - Gloves.	
		(b) Checking connecting rod straightness	Brainstorm Guide students to define terms, Identify tools for checking connecting rod straightness Practical work Guide students on how to check connecting rod straightness Activity Organize students in	Students should be able to: - Select tools and equipment - Clean connecting rod. - Match connecting rod with its cap. - Align connecting rod. - Observe safety	Checked connecting rod conforms to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Perform connecting rod straightening. Principles: Students should explain the principles of: - Aligning connecting rods. Theories: Students should explain: - Purpose of connecting rod. - Importance of checking connecting rod	The following tools, equipment and safety gears are to be available: - Connecting rod jig. - Surface plate. - Work bench. - Dial gauges. - Telescopic gauge. - Inside and outside micrometer. - Thin wire. - Hammer.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			manageable group to check connecting rod straightness	precautions. • Clean tools, equipment and work place. • Store tools, equipment and parts.		alignment. • Tools and equipment used for checking connecting rod alignment. • Causes of connecting rod failures and their remedies. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while checking connecting rods. • Safe handling of work tools and equipment. • Waste disposal.	• Service manual. • Overall. • Safety glasses. • Safety boots. • Gloves.	
	1.7 Checking piston wear	(a) Checking pistons measurements	Brainstorm Guide students to define terms, identify function of Piston Practical work Guide students on how to check pistons	Students should be able to: • Select tools and equipment • Dismantle piston. • Clean piston. • Inspect	Checked Piston conforms to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Take piston measurements. Principles: Students should explain the principles of piston constructions. Theories: Students	The following tools, equipment and safety gears are to be available: • Manual book. • Piston assembly. • External micrometer. • Feeler gauge.	10

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			measurements . Activity Organize students in manageable group to check pistons measurements.	piston crowns, ring lands and grooves. - Identify piston measuring positions. - Observe safety precautions. - Clean tools, equipment and work place. - Store tools, equipment and parts.		should explain: - Types of pistons. - Function of piston. - Materials used to manufacture pistons. - Importance of taking various piston measurements. - Causes of piston defects. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while checking piston wear. - Safe handling of work tools and equipment. - Waste disposal.	- Piston ring groove cleaner. - Vernier caliper. - Piston ring expander. - Scraper. - Work bench. - Oil can. - Safety boots. - Gloves. - Overall.	
	1.8 Assembling engines	(a) Assembling engine components	Discussion Guide students to define, Identify engine components Practical work Guide students on how to	Students should be able to: - Select tools and equipment - Identify major component	Engine assembled as per manufacturer's specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Inspect engine components. - Recondition engine parts. - Assemble engine.	The following tools, equipment and safety gears are to be available: - Engine components. - Tool kit. - Engine crane.	10

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			assemble engine components Activity Organize students in manageable group to assemble engine components	s of engine. - Assemble engine components. - Observe safety precautions. - Test engine. - Clean tools, equipment and work place. - Store tools and equipment		Principles: Students should explain the principles of: - Assembling Engines. - Testing engine. Theories: Students should explain: - Different types of materials used to manufacture engine components. - Different designs of engine components. - Engine operations. - Function of major engine parts. - Service procedure for reconditioning engines. - Standard piston sizes. - Reassembling steps of an engine after service. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while assembling engines.	- Steel rope. - Micrometer (internal and external). - Torque wrench. - Feeler gauge. - Dial indicator gauge. - Vee-blocks. - Pry bar. - Valve spring compressor. - Bench vice. - Bench. - Service manual. - Ring squeezer. - Oil can. - Spark plug spanner - Filter wrench - Compression tester. - Cylinder leakage tester. - Engine test bench. - Timing light.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
						- Safe handling of work tools and equipment. - Waste disposal.	- Safety boots. - Overall. - Gloves.	
2.0 Servicing Fuel Systems	2.1 Servicing Petrol Fuel Systems	(b) Servicing carburetion fuel system	Question and answer Guide students to define terms, identify parts of carburetion fuel system Practical work Guide students on how to service carburetion fuel system Activity Organize students in manageable group to service carburetion fuel system	Students should be able to: - Select tools and equipment - Service carburetion fuel system - Observe safety precautions. - Test fuel system. - Clean tools, equipment and work place. - Store tools, equipment and parts.	Carburetion fuel system serviced conforms to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Diagnose components of fuel system. Principles: Students should explain the principles of: - Servicing carburetors and fuel injection systems. Theories: Students should explain: - The components used in petrol fuel system. - Types of carburetors. - The functions of carburetors. - Advantages of fuel injection over carburetion. - The importance of servicing the fuel system.	The following tools, equipment and safety gears are to be available: - Vehicle with petrol engine (carburetion system or fuel injection). - Work bench. - Set of screw drivers. - Tool kit. - Vacuum tester. - Wire brush. - Fuel consumption meter. - Air compressor - Air gun. - Covering blankets. - Fuel pressure gauge.	42

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
						Circumstantial knowledge: Detailed knowledge about: - Safety precautions while servicing petrol fuel system. - Safe handling of work-tools, parts, fuel and equipment. - Waste disposal	- Multimeter. - Gloves - Overall. - Safety boots.	
		(c) Servicing electronic fuel injection system.	Demonstration Lead students to define terms, identify parts of electronic fuel injection system Practical work Guide students on how to Service electronic fuel injection system. Activity Organize students in manageable group to	Students should be able to: - Select tools and equipment - Service electronic fuel control system. - Observe safety precautions. - Clean tools, equipment and work place. - Store tools,	Electronic fuel injection system serviced conforms to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Replace faulty injector nozzle/valves. Principles: Students should explain the principles of: - Construction of Electronic fuel Injection system. Theories: Students should explain: - The components used in electronic fuel injection system. - The importance of servicing electronic	The following tools, equipment and safety gears are to be available: - Vehicle with electronically controlled fuel system. - Work bench. - Set of screw drivers. - Tool kit. - Vacuum tester. - Wire brush. - Fuel consumption meter. - Air compressor	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			Service electronic fuel injection system.	equipment and parts.		fuel injection system. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while servicing petrol fuel system. - Safe handling of work-tools, parts, fuel and equipment. - Waste disposal.	- Air gun. - Covering blankets. - Fuel pressure gauge - Multimeter - Gloves - Overall - Safety boots	
	2.2 Repairing natural gas fuel Systems.	(d) Servicing LPG system components.	Brainstorm Guide students to define, identify LPG system components. Practical work Guide students on how to Service LPG system components. Activity Organize students in manageable group to	Students should be able to: - Select tools and equipment - Use computer for checking the system functionality. - Replace natural gas tank. - Inspect gas leakages. - Replace	LPG system components fuel system conforms to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Service LPG system components Principles: Students should explain the principles of: Servicing LPG system components. Theories: Students should explain: - Components used in LPG system components. - Characteristics of natural gas.	The following tools, equipment and safety gears are to be available: - Vehicle equipped with natural gas fuel system. - Service manual. - Tool kit. - Engine analyzer. - Computer. - Multimeter - Work bench. - Gloves.	42

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			Service LPG system components.	defective components. • Observe safety precautions. • Clean tools, instruments, equipment and workplace • Store tools, equipment and parts.		• Importance of checking system leakage. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while repairing natural gas fuel system. - Safe handling of work tools, equipment and parts. - Waste disposal.	• Overall. • Safety boots.	
		(e) Servicing CNG system components	Discussion Guide students to define terms, identify CNG system components Practical work Guide students on how to Service CNG system components Activity	Students should be able to: - Select tools and equipment - Use computer for checking the system functionality. - Service CNG	Serviced CNG system components conforms to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Perform on board diagnosis Principles: Students should explain the principles of: - Servicing CNG system components Theories: Students should explain: - Components used in CNG system	The following tools, equipment and safety gears are to be available: - Vehicle equipped with natural gas fuel system. - Service manual. - Tool kit. - Computer - Multimeter	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			Organize students in manageable group to Service CNG system components	system components • Replace defective components. • Observe safety precautions. • Clean tools, instruments, equipment and workplace • Store tools, equipment and parts.		• Use of service manual. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while repairing natural gas fuel system. - Safe handling of work tools, equipment and parts. - Waste disposal.	• Work bench. • Gloves. • Overall. • Safety boots.	
	2.3 Servicing Diesel Fuel Systems	(a) Servicing diesel supply system	Brainstorm Guide students to define, identify diesel fuel Systems components Practical work Guide students on how to Service diesel	Students should be able to: - Select tools and equipment - Diagnose components of diesel fuel system.	Serviced diesel fuel system conforms to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Perform on board diagnosis of diesel fuel system. Principles: Students should explain the principals involved in: - Servicing diesel	The following tools, equipment and safety gears are to be available: - Vehicle /tractor with diesel engine. - Service manual. - Fuel pressure	42

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			supply system Activity Organize students in manageable group to service diesel supply system	• Service diesel supply system • Observe safety precautions. • Clean tools and work place. • Store tools, equipment and parts.		fuel systems. • Diesel combustion processes. Theories: Students should explain: • Properties of diesel fuel. • Diesel engine operation. • Diesel system construction. • Function of diesel fuel system components. • Nozzle spraying patterns. • Use of service manual. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while servicing diesel fuel systems. • Safe handling of work tools and equipment. • Waste disposal.	testing equipment. • Tool kit. • Stoppers/wheel blocks. • Injector nozzle testing machine. • Injector pump testing machine. • Containers for keeping parts. • Vacuum gauge. • Overall. • Safety boots. • Gloves. • Safety goggles. • Helmet.	
		(b) Carrying out diesel smoke test.	Discussion Lead students to describe the	Students should be able to:	Serviced diesel fuel system	Knowledge evidence: Detailed knowledge of: Method used: Students	The following tools, equipment and safety gears	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			concept of diesel smoke test Practical work Guide students on how to carry out diesel smoke test Activity Organize students in manageable group to carry out diesel smoke test	- Select tools and equipment - Carry out diesel smoke test - Observe safety precautions. - Clean tools and work place. - Store tools, equipment and parts.	conforms to technical specifications .	should explain how to: - Carry out diesel smoke test Principles: Students should explain the principles involved in: - Diesel combustion processes. Theories: Students should explain: - Procedures for Carrying out diesel smoke test. - Use of service manual. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while servicing diesel fuel systems. - Safe handling of work tools and equipment. - Waste disposal.	are to be available: - Vehicle / tractor with diesel engine. - Service manual. - Fuel pressure testing equipment. - Tool kit. - Stoppers/wheel blocks. - Containers for keeping parts. - Vacuum gauge. - Overall. - Safety boots. - Gloves. - Safety goggles. - Helmet.	
3.0 Maintaining Emission Control System	3.1 Servicing Catalytic Converter	(a) Inspecting catalytic converter	Discussion Guide students to describe concept of catalytic converter	Students should be able to: Use service manual	Catalytic converter Inspected as per manufacturer's service	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: Inspect catalytic converter	The following tools, equipment and safety gears are to be available: Service	23

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			Practical work Guide students on how to Inspect catalytic converter Activity Organize students in manageable group to Inspect catalytic converter	- Select tools and equipment - Inspect catalytic converter - Test catalytic converter - Clean tools, equipment and work place - Store tools and equipment	manual	Principles: Students should explain the principle of: - Checking catalytic converter for leaks and damage Theories: Students should explain:- - Functions of catalytic converter - Types of catalytic converter - Importance of catalytic converter Circumstantial knowledge Detailed knowledge about: - Safety precautions while Inspecting catalytic converter - Handling of tools and equipment	Manual - Tool kit - Pipe cutter - Air compressor - Exhaust gas analyzer - Overall - Safety boot - Gloves - Safety clear glasses	
		(b) Repairing catalytic converter	Discussion Guide students to identify procedures for repairing catalytic converter	Students should be able to: - Use service manual - Select tools and	Catalytic converter repaired as per manufacturer's service manual	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: Repair catalytic converter Principles: Students should explain the	The following tools, equipment and safety gears are to be available: - Service Manual - Tool kit	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			Practical work Guide students on how to repair catalytic converter Activity Organize students in manageable group to repair catalytic converter	equipment - Repair catalytic converter - Replace catalytic converter - Clean tools, equipment and work place - Store tools and equipment		principle of: - Repairing catalytic converter Theories: Students should explain:- - Importance of repairing catalytic converter Circumstantial knowledge Detailed knowledge about: - Safety precautions while servicing catalytic converter - Handling of tools and equipment	- Pipe cutter - Air compressor - Exhaust gas analyzer - Overall - Safety boot - Gloves - Safety clear glasses	
	3.2 Servicing Oxygen Sensor	(a) Inspecting oxygen sensor	Brainstorm Guide students to define, Identify function of oxygen sensor Practical work: Guide students on how to Inspect oxygen sensor Activity	Students should be able to: - Use service manual - Select tools and equipment - Inspect oxygen sensor - Testing oxygen sensor	Oxygen sensor serviced as per manufacturer's service manual	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Inspect oxygen sensor Principles: Students should explain the principle of: - Inspect oxygen sensor Theories: Students should explain: - Importance of cleaning oxygen	The following tools, equipment and safety gears are to be available: - Service Manual - Tool kit - Multimeter - Scan tool - Exhaust gas analyzer - Torque wrench - Sensor	23

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			Organize students in manageable group to Inspect oxygen sensor	- Clean tools, equipment and work place - Store tools and equipment		sensor - Testing oxygen sensor - Functions of oxygen sensor - Types of oxygen sensors Circumstantial knowledge Detailed knowledge about: - Safety precautions while Inspecting oxygen sensor - Handling of tools and equipment - Waste disposal	installation tool - Air compressor - Overall - Safety boot - Gloves - Safety clear glasses	
		(b) Replacing an oxygen sensor	Discussion Guide students to define terms, identify procedures for replacing an oxygen sensor Practical work Guide students on how to replace an oxygen sensor Activity	Students should be able to: - Use service manual - Select tools and equipment - Replacing oxygen sensor - Testing oxygen sensor	Oxygen sensor serviced as per manufacturer's service manual	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Check oxygen sensor Principles: Students should explain the principle of: - Replacing oxygen sensor Theories: Students should explain:- - Importance of replacing oxygen	The following tools, equipment and safety gears are to be available: - Service Manual - Tool kit - Multimeter - Scan tool - Exhaust gas analyzer - Torque wrench	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			Organize students in manageable group to replace an oxygen sensor	- Clean tools, equipment and work place - Store tools and equipment		sensor Circumstantial knowledge Detailed knowledge about: - Safety precautions while servicing oxygen sensor - Handling of tools and equipment - Waste disposal	- Sensor installation tool - Air compressor - Overall - Safety boot - Gloves - Safety clear glasses	
	3.3 Repairing Muffler And Pipes	(a) Repairing exhaust system components	Brainstorm Guide students to define, identify function of exhaust system components Demonstration Demonstrate to students on how to repair exhaust system components Practical work Organize students in manageable group to practice how to	Students should be able to: - Use service manual - Select tools and equipment - Check leakages and damage of exhaust system - Repair exhaust system components - Test	Exhaust system components repaired as per manufacturer's service manual.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Repair exhaust system components Principles: Students should explain the principles of: - Repairing exhaust system components Theories: Students should explain:- - Importance of repairing exhaust system components - Functions of exhaust Circumstantial knowledge Detailed knowledge	The following tools, equipment and safety gears are to be available: - Service Manual - Tool kit - Scan tool - Exhaust gas analyzer - Pipe cutter - Overall - Safety boot - Safety clear glasses - Gloves	23

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			repair exhaust system components	components of exhaust system • Clean tools, equipment and work place • Store tools and equipment		about: • Safety precautions while servicing repairing exhaust components • Handling of tools and equipment • Waste disposal		
		(b) Replacing exhaust system components	Discussion Guide students to define, Identify procedures for replacing exhaust system components Demonstration Guide students on how to replace exhaust system components Activity Organize students in manageable	Students should be able to: • Use service manual • Select tools and equipment • Replacing exhaust system components • Test components of exhaust system • Clean	Exhaust system components replaced as per manufacturer's service manual.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Replace exhaust system components • Test exhaust system Principles: Students should explain the principles of: • Replacing exhaust system Theories: Students should explain:- • Procedures for replacing exhaust system Circumstantial knowledge Detailed knowledge	The following tools, equipment and safety gears are to be available: • Service Manual • Tool kit • Scan tool • Exhaust gas analyzer • Pipe cutter • Overall • Safety boot • Safety clear glasses • Gloves	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			group to replace exhaust system components	tools, equipment and work place • Store tools and equipment		about: • Safety precautions while replacing exhaust components • Handling of tools and equipment • Waste disposal		
4.0 Servicing Transmission System	4.1 Servicing Clutches	(a) Servicing clutch components.	Discussion Guide students to describe concept of clutch components Practical work Guide students on how to Service clutch components. Activity Organize students in manageable group to Service clutch components.	Students should be able to: • Select tools and equipment. • Remove clutch from engine. • Clean clutch assembly. • Inspect clutch assembly. • Dismantle clutch. • Service clutch components • Check flywheel	Serviced clutch functions according to manufacturer's standards.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Remove clutch from engine. • Clean clutch assembly. • Check height of release fingers. • Adjust release fingers. • Install clutch to vehicle. • Use service manuals. Principles: Students should explain the principle of: • Clutches construction and operation. • Cleaning clutch components.	The following tools, equipment and safety gears are to be available: • Vehicle / tractor. • Work bench. • Tool kit. • Hydraulic press. • Steel rule. • Feeler gauge. • Straight edge bar. • Clutch aligning tool. • Wheel blocks. • Surface plate. • Overall. • Safety boots. • Gloves.	10

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
				and pilot bearing. - Assemble clutch. - Observe safety precautions - Test clutch performance - Clean tools and workplace - Store tools, equipment and parts.		- Servicing clutch components. - Installing clutch plate. Theories: Students should explain: - Functions of clutch and components. - Type of clutches. - Clutch faults, causes and their remedies. - Clutch free play. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while servicing clutches. - Safe handling of work tools, equipment and parts. - Waste disposal	- Safety goggles. - Masks.	
	4.2 Overhauling Manual Gearboxes	(b) Overhauling main gearbox	Discussion Guide students to describe concept of main gearbox Demonstration	Students should be able to: - Select tools and equipment. - Dismantle	Overhauled main gearbox conforms to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: Dismantle manual gearboxes. Principles: Students	The following tools, equipment and safety gears are to be available: Vehicle / tractor	20

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			Demonstrate to students on how to overhaul main gearbox Activity Organize students in manageable group to practice overhauling main gearbox	main gearboxes • Clean parts. • Examine parts. • Replace defective parts. • Reassemble gearbox. • Refill gearbox oil. • Observe safety precautions • Test gearbox. • Clean tools and work place. • Store tools, equipment and parts.		should explain the principles of: • Construction and operation of main gearboxes. Theories: Students should explain: • Function of gearbox. • Types of gear boxes. • Gear box defects, causes and their remedies. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while overhauling main gearboxes. • Safe handling of work tools, equipment and parts. • Waste disposal.	• Manual gearbox. • Tool kit. • Waste oil container. • Plastic hammer. • Set of Pullers. • Hoist or service pit. • Tyre lever. • Work bench. • Service manual. • Oil can. • Steel pan. • Gearbox rotating stand. • Transmission jack. • Torque wrench. • Vernier caliper. • External micrometers. • Feeler gauge. • Safety boots. • Overall. • Gloves.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
		(c) Overhauling auxiliary gearbox	Discussion Lead students to describe concept of auxiliary gearbox Demonstration Guide students on how to overhaul auxiliary gear box Activity Organize students in manageable group to practice overhauling auxiliary gear box	Students should be able to: • Select tools and equipment. • Dismantle auxiliary gearboxes • Clean parts. • Examine parts. • Replace defective parts. • Reassemble gearbox. • Refill gearbox oil. • Observe safety precautions • Test gearbox. • Clean tools and work place. • Store tools, equipment	Overhauled gearbox conforms to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Dismantle auxiliary gearboxes. Principles: Students should explain the principles of: • Construction and operation of manual gearboxes. • Vehicle speed and torque. Theories: Students should explain: • Function of auxiliary transmissions. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while overhauling auxiliary gearboxes. • Safe handling of work tools, equipment and parts. • Waste disposal.	The following tools, equipment and safety gears are to be available: • Vehicle / tractor. • Manual gearbox. • Tool kit. • Waste oil container. • Plastic hammer. • Set of Pullers. • Hoist or service pit. • Work bench. • Service manual. • Oil can. • Steel pan. • Gearbox rotating stand. • Transmission jack. • Torque wrench. • Feeler gauge. • Safety boots.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
				and parts.			- Overall. - Gloves.	
	4.3 Overhauling final drive unit	(a) Servicing final drive	Discussion Guide students to describe concept of final drive Demonstration Lead students on how to Service final drive Activity Organize students in manageable group to Service final drive	Students should be able to: - Select tools and equipment. - Dismantle final drive. - Replace defective final drive components - Service differential locks. - Reassemble final drive unit. - Observe safety precautions. - Test final drive unit. - Clean tools, equipment and work place.	Final drive serviced to meet technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Perform final drive adjustments. Principles: Students should explain the principles of: - Construction of final drive units. - Making final drive unit adjustments. Theories: Students should explain: - Function of final drive unit. - Types of gears. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while servicing final drive unit. - Safe handling of work-tools, equipment and parts. - Waste disposal.	The following tools, equipment and safety gears are to be available: - Vehicle / tractor. - Final drive unit. - Tool kit. - Work bench. - Bench vice. - Final drive unit stand. - Dial gauge. - Service manual. - Spring scale. - Pinion depth gauge. - Engineering blue. - Brush. - Set of Pullers. - Rubber hammer. - Feeler gauge. - Sisal rope. - Gloves	19

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
				Store tools, equipment and parts.			- Overall. - Safety boots. - Helmet.	
		(b) Testing crown wheel and pinion backlash	Discussion Guide students to define terms, identify function of crown wheel and pinion backlash Demonstration Lead students on how to test crown wheel and pinion backlash Activity Organize students in manageable group to test crown wheel and pinion backlash	Students should be able to: - Select tools and equipment. - Observe safety precautions. - Test crown wheel and pinion backlash. - Clean tools, equipment and work place. - Store tools, equipment and parts.	Crown wheel and pinion backlash Tested to meet technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Test crown wheel and pinion backlash. Principles: Students should explain the principles of: - Crown wheel and pinion backlash adjustments. Theories: Students should explain: - Function crown wheel and pinion backlash Circumstantial knowledge: Detailed knowledge about: - Safety precautions while Testing crown wheel and pinion backlash - Safe handling of work-tools, equipment and	The following tools, equipment and safety gears are to be available: - Vehicle / tractor. - Final drive unit. - Tool kit. - Work bench. - Bench vice. - Final drive unit stand. - Dial gauge. - Service manual. - Spring scale. - Pinion depth gauge. - Engineering blue. - Brush. - Set of Pullers. - Rubber hammer. - Feeler gauge. - Sisal rope.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
						parts. • Waste disposal.	• Gloves • Overall. • Safety boots. • Helmet.	
	4.4 Servicing Automatic Transmissions	(a) Changing automatic transmission fluid (ATF)	Discussion Guide students to describe concept of automatic transmission fluid (ATF) Demonstrate Lead students on how to Change automatic transmission fluid (ATF) Activity Organize students in manageable group to Change automatic transmission fluid (ATF)	Students should be able to: • Select tools and equipment. • Check automatic transmission fluid level. • Change automatic transmission fluid (ATF). • Observe safety precautions. • Clean tools and work place. • Store tools, equipment and parts	Serviced automatic transmission operates according to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Check automatic transmission fluid level. Principles: Students should explain the principles of: • Checking fluid level. Theories: Students should explain: • Types of automatic transmissions • Functions of main components of automatic transmission or transaxle. • Five preliminary checks for automatic transmission or transaxle. • Effect of engine condition on	The following tools, equipment and safety gears are to be available: • Vehicle with automatic transmission. • Service manual. • Tool kit • Wheel blocks. • Hydraulic pressure tester. • Overall. • Safety boots. • Gloves. Safety clear glasses.	19

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
						transmission or transaxle. • Adjustments required on automatic transmissions or transaxles. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while changing automatic transmission fluid (ATF). • Safe handling of work-tools, equipment and parts. • Waste disposal.		
		(b) Changing ATF filter	Discussion Guide students to define terms, identify function of ATF filter Demonstration Guide students on how to Change ATF	Students should be able to: • Select tools and equipment • Change ATF filter • Observe safety precaution	ATF filter changed according to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Change ATF filter Principles: Students should explain the principles of: • Changing ATF filter Theories: Students	The following tools, equipment and safety gears are to be available: • Vehicle with automatic transmission. • Service manual. • Tool kit	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			filter Activity Organize students in manageable group to Change ATF filter	s. - Clean tools and work place. - Store tools, equipment and parts.		should explain: - Function of ATF filter - Procedures for changing ATF filter Circumstantial knowledge: Detailed knowledge about: - Safety precautions while Changing ATF filter - Safe handling of work-tools, equipment and parts. - Waste disposal.	- Wheel blocks. - Hydraulic pressure tester. - Overall. - Safety boots. - Gloves.	
5.0 Servicing Hydraulic Systems	5.1 Repairing Hydraulic Pipes	(a) Brazing hydraulic pipes	Discussion Lead students to describe concept of brazing hydraulic pipes Demonstrate Guide students on how to braze hydraulic pipes Activity Organize	Students should be able to: - Select tools and equipment - Perform hydraulic pressure. - Braze hydraulic pipes - Observe safety	Brazed hydraulic pipes conform to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - The process of dismantling/disconnecting and connecting hydraulic pipes and hoses Principles: Students should explain the principle of:	The following tools, equipment and safety gears are to be available: - Service manual. - Vehicle / tractor with hydraulic system. - Tool kit. - Hydraulic gauges	82

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			students in manageable group to braze hydraulic pipes	precautions. • Clean tools, equipment and work place. • Store tools, equipment and parts.		• Hydraulics. • Repairing hydraulic pipes and hoses. Theories: Students should explain: • Hydraulic system. • Functions of hydraulic system components. Circumstantial knowledge: Detailed knowledge about: Safety precautions while servicing hydraulic pipes. • Safe handling of work tools and equipment. • Waste disposal.	• Couplings. • Hose pipes. • Steel pipes. • Hydraulic container. • Overall. • Gloves. • Safety boots. • Safety goggles.	
		(b) Flushing hydraulic systems	Discussion Guide students to define, identify procedures for flushing hydraulic systems Demonstration Guide students on how to flush	Students should be able to: • Select tools and equipment. • Flush of hydraulic systems. • Observe safety precaution	Flushed hydraulic pipes conform to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Flush hydraulic system. Principles: Students should explain the principle of: • Flushing hydraulic system. Theories: Students	The following tools, equipment and safety gears are to be available: • Service manual. • Vehicle / tractor with hydraulic system. • Tool kit.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			hydraulic systems Activity Organize students in manageable group to practice flushing hydraulic systems	• s. Clean tools, equipment and work place. • Store tools, equipment and parts.		should explain: • Maintenance requirements of hydraulic pipes. • Procedures for Flushing hydraulic system Circumstantial knowledge: Detailed knowledge about: • Safety precautions while flushing hydraulic system • Safe handling of work tools and equipment. • Waste disposal.	• Hydraulic gauges • Couplings. • Hose pipes. • Steel pipes. • Hydraulic container. • Overall. • Gloves. • Safety boots. • Safety goggles.	
		(c) Removing air from the system.	Discussion Guide students to identify reasons for removing air from hydraulic system. Demonstration Guide students on how to Remove air from hydraulic system	Students should be able to: • Select tools and equipment. • Remove air from the system. • Observe safety precautions • Clean	Repaired hydraulic pipes conform to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Remove air from system. Principles: Students should explain the principle of: • Removing air from the system. Theories: Students should explain: • The importance of	The following tools, equipment and safety gears are to be available: • Service manual. • Vehicle / tractor with hydraulic system. • Tool kit. • Hydraulic gauges	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			Activity Organize students in manageable group to practice removing air from hydraulic system	tools, equipment and work place. Store tools, equipment and parts.		removing air from the system. Circumstantial knowledge: Detailed knowledge about: Safety precautions while removing air from the system. - Safe handling of work tools and equipment. - Waste disposal.	- Couplings. - Hose pipes. - Steel pipes. - Hydraulic container. - Overall. - Gloves. - Safety boots. - Safety goggles.	
	5.2 Servicing hydraulic actuators	(a) Servicing hydraulic cylinders	Discussion Guide students to identify function of hydraulic cylinders Demonstrate Guide students on how to Service hydraulic cylinders Activity Organize students in manageable group to	Students should be able to: - Use service manual. - Select tools and equipment. - Service hydraulic cylinders. - Observe safety precautions. - Clean tools, equipment	Serviced hydraulic Cylinders conform to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Service hydraulic cylinders. Principles: Students should explain the principles of construction and operation of hydraulic cylinders. Theories: Students should explain: - Function of hydraulic cylinders. - Periodic inspection and maintenance of cylinders	The following tools, equipment and safety gears are to be available: - Vehicle / tractor with hydraulic systems. - Service manual. - Forklift. - Tool kit. - Hydraulic gauges. - Couplings/hose pipes/steel pipes. - Container.	60

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			Service hydraulic cylinders	and work place. Store tools, equipment and parts.		Circumstantial knowledge: Detailed knowledge about: - Safety precautions while servicing hydraulic cylinders. - Safe handling of work tools and equipment. - Waste disposal.	- Funnel. - Trolley. - Trolley Jack. - Overall. - Safety boots. - Gloves. - Safety goggles. - Helmet.	
		(b) Servicing hydraulic gear type motor	Discussion Guide students to analyze function of hydraulic gear type motor Demonstrate Guide students on how to Service hydraulic gear type motor Activity Organize students in manageable group to Service hydraulic gear	Students should be able to: - Use service manual. - Select tools and equipment. - Service hydraulic gear type motor. - Observe safety precautions. - Clean tools, equipment and work	Serviced hydraulic gear type motor conform to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Service hydraulic gear type motor. Principles: Students should explain the principles of construction and operation of hydraulic gear type motor Theories: Students should explain: - Function hydraulic gear type motor. Circumstantial knowledge: Detailed knowledge about: - Safety precautions	The following tools, equipment and safety gears are to be available: - Vehicle / tractor with hydraulic systems. - Service manual. - Forklift. - Tool kit. - Hydraulic gauges. - Couplings/hose pipes/steel pipes. - Container. - Funnel.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			type motor	place. Store tools, equipment and parts.		while servicing hydraulic gear type motor. - Safe handling of work tools and equipment. - Waste disposal.	- Trolley. - Trolley Jack. - Overall. - Safety boots. - Gloves. - Safety goggles. - Helmet.	
6.0 Carrying Out Welding Processes	6.1 Performing TIG and MIG Welding	(a) Performing TIG welding	Discussion Lead students to describe concept of TIG welding Demonstration Guide students on how to perform TIG welding Activity Organize students in manageable group to perform TIG welding	Students should be able to: - Select tools and equipment. - Use TIG equipment. - Perform TIG welding - Inspect weld metal defects. - Observe safety precautions. - Clean tools, equipment and work place.	TIG Welded work piece conforms to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to apply TIG welding techniques. Principles: Students should explain the principle of: - TIG welding. Theories: Students should explain: - Types of TIG and filler wires and nozzles. - The importance of high frequency starting unit. - The difference between TIG and MIG welding techniques. - Use of cleaning	The following tools, equipment and safety gears are to be available: - TIG welding machines. - Argon cylinder. - Carbon dioxide cylinder. - Flow meter. - Welding gun/torch. - Work bench. - Bench vice. - Angle grinder. - Welding shield. - Canvas spats. - Pressure	26

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
				Store tools and equipment		acid. - Types of materials for TIG Circumstantial knowledge: Detailed knowledge about: - Safety precautions while performing TIG welding. - Safe handling of work tools, equipment and work piece - Waste disposal	regulator. - Chipping ball pein Hammer. - Hacksaw. - Scraper. - Chisel. - Steel rule/tape measure. - Clear goggles. - Leather gloves. - Leather apron. - Overall. - Safety boots. - Helmet.	
		(b) Performing MIG welding	Demonstration Demonstrate to students tools and equipment used to perform MIG welding Practical work Guide students on how to perform MIG welding	Students should be able to: - Select tools and equipment. - Use MIG equipment. - Perform MIG welding. - Inspect	MIG Welded work piece conforms to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to apply MIG welding techniques. Principles: Students should explain the principle of: MIG welding. Theories: Students should explain:	The following tools, equipment and safety gears are to be available: - MIG welding machines. - Argon cylinder. - Carbon dioxide cylinder.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			Activity Organize students in manageable group to perform MIG welding.	weld metal defects. - Observe safety precautions. - Clean tools, equipment and work place. - Store tools and equipment.		- Types of MIG filler wires and nozzles. - The importance of high frequency starting unit. - Use of cleaning acid. - Types of materials for MIG welding. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while performing MIG welding. - Safe handling of work tools, equipment and work piece. - Waste disposal.	- Flow meter. - Welding gun/torch. - Work bench. - Bench vice. - Angle grinder. - Welding shield. - Canvas spats. - Pressure regulator. - Chipping ball pein Hammer. - Hacksaw. - Scraper. - Chisel. - Steel rule/tape measure. - Clear goggles. - Leather gloves. - Leather apron. - Overall. - Safety boots. - Helmet.	
	6.2	(a) Performing	Discussion	Students	Resistance	Knowledge evidence:	The following	20

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
	Performing Resistance Welding	resistance welding	Guide students to define terms, identify tools and equipment used to perform resistance welding Demonstration Guide students on how to perform resistance welding Activity Organize students in manageable group to perform resistance welding.	should be able to: • Interpret working drawings. • Select tools and equipment • Perform resistance welding process. • Observe safety precautions. • Clean tools, equipment, work piece and work place. • Store tools and equipment.	welded parts conform to technical specifications .	Detailed knowledge of: Method used: Students should explain how resistance welding is performed Principles: Students should explain the principle of: • Operation of resistance welding equipment. • Resistance welding. • Aligning equidistantly copper electrodes to work pieces on chucks. Theories: Students should explain: • Main parts of resistance welding equipment and their functions. • Importance of setting suitable current and time according to plate thickness. • Meaning of hold time, squeeze time and off period time. • Requirements of	tools, equipment and safety gears are to be available: • Resistance welding machine. • Working drawings/diagrams. • Measuring tape. • Tool kit. • Scriber. • Work bench. • Flat files. • Pair of Tong. • Wire brush. • Safety boots. • Welding shield. • Leather gloves. • Leather aprons. • Safety clear glasses. • Overall. • Helmet.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
						resistance welding electrodes. - Resistance welding variables. - Selection of resistance welding process. - Joint design. - Metallurgical effects on welded joint. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while performing resistance welding - Safe handling of work tool, equipment and work place. - Waste disposal.		
	6.3 Performing Butt Fusion Welding	6.3.1 Performing Butt fusion welding	Discussion Guide students to define terms, identify tools and equipment used to perform Butt fusion welding	Students should be able to: Students should be able to: - Select tools and equipment. - Use butt	Welded work piece conforms to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to apply Butt fusion welding techniques. Principles: Students should explain the principle of:	The following tools, equipment and safety gears are to be available: - Butt fusion welding machines. - hot plates	20

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			Demonstration Guide students on how to perform butt fusion welding Activity Organize students in manageable group to perform Butt fusion welding	fusion equipment • Perform Butt fusion welding • Inspect weld metal defects. • Observe safety precautions. • Clean tools, equipment and work place. • Store tools and equipment.		• Determining Fusion Pressure Theories: Students should explain: • Types of Butt fusion welding machine. • Hydraulic Butt Fusion Machine Procedure. • Types of materials for Butt fusion welding. • Butt Fusion Joint Troubleshooting • How to Use the Fusion Pressure Calculator • Butt fusion welding. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while performing Butt fusion welding • Safe handling of work tool, equipment and work place. • Waste disposal	• peelers • scrapers • hydraulic parts • welding clamp inserts • data loggers • Bench vice. • Welding shield. • Canvas spats. • Hacksaw. • Scrapper. • Chisel. • Steel rule/tape measure. • Clear goggles. • Leather gloves. • Leather apron. • Overall. • Safety boots. • Helmet.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
7.0 Maintaining tillage machinery	7.1 Performing Tillage Machinery	(a) Operating primary and secondary tillage implement	Discussion Guide students to describe pre operation checks of primary and secondary tillage implements Demonstration Demonstrate to students on how to operate primary and secondary tillage implements forward and reverse Activity Organize students in manageable group to practice to operate primary and secondary tillage implement	Students should be able to: • Interpret drawings. • Select tools and equipment. • Conduct inspection on tillage machines. • Operate primary tillage implements. • Operate tillage secondary implements. • Observe safety precautions. • Clean tools, equipment and work place. • Store tools	Tillage machines operation conform to technical rules and regulations.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Operate primary and secondary tillage implement Principles: Students should explain the principle of: • Operation of primary and secondary tillage implement Theories: Students should explain: • Types of tillage implements. • Use of each implement. • Operation of each implement. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while operating tillage machinery. • Safe handling of working tools and equipment's.	The following tools, equipment and safety gears are to be available: • Mould board plough. • Disc plough. • Chisel plough. • Subsoiler. • Scrapers. • Land planners. • Disc harrow. • Spikes. • Spring tooth harrows. • Rotavator. • Ridger. • Field rollers. • Service manuals. • Tool kit. • Grease Gun. • Oil can. • Air compressor. • Hand grinder. • Safety goggles.	50

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
				and equipment.		Waste disposal.	- Safety boots. - Overall. - Gloves. - Helmet.	
		(b) Servicing primary tillage implements.	Discussion Guide students to describe concept of, primary tillage Demonstration Guide students on how to service primary tillage implements Activity Organize students in manageable group to service primary tillage implements	Students should be able to: - Interpret drawings. - Select tools and equipment. - Conduct inspection on tillage machines. - Service primary tillage implements. - Perform relevant adjustments on tillage machines. - Observe safety precautions. - Clean tools,	Serviced primary tillage machines conform to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Conduct adjustments on tillage machine. Principles: Students should explain the principle of: - Servicing different implements. Theories: Students should explain: - Identify primary tillage implements - Functions of primary tillage implements - Repair of different tillage implements - Replace worn out parts. - Service different tillage machines. Circumstantial knowledge: Detailed knowledge	The following tools, equipment and safety gears are to be available: - Mould board plough. - Disc plough. - Chisel plough. - Subsoiler. - Scrapers. - Rotavator. - Ridger. - Service manuals. - Tool kit. - Grease Gun. - Oil can. - Air compressor. - Safety goggles. - Safety boots. - Overall. - Gloves. - Helmet.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
				equipment and work place. • Store tools and equipment's.		about: • Safety precautions while servicing primary tillage machinery. • Safe handling of working tools and equipment. • Waste disposal.		
		(c) Servicing secondary tillage implements	Discussion Guide students to define, Identify parts and function secondary tillage implements Practical work Guide students on how to Service secondary tillage implements Activity Organize students in manageable group to Service	Students should be able to: • Interpret drawings. • Select tools and equipment. • Conduct inspection on secondary tillage machines. • Service tillage secondary implements. • Perform relevant adjustments on tillage	Serviced secondary tillage machines conform to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Conduct adjustments on tillage machine. • Replace worn out parts. • Service different tillage machines. Principles: Students should explain the principle of: • Servicing different secondary implements. Theories: Students should explain: • Repair of different secondary tillage implements. Circumstantial	The following tools, equipment and safety gears are to be available: • Subsoiler • Scrapers. • Disc harrow. • Spikes • Spring tooth harrows. • Rotavator. • Ridger. • Field rollers. • Service manuals. • Tool kit. • Grease Gun. • Oil can. • Air compressor. • Safety	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			secondary tillage implements	machines. - Observe safety precautions - Clean tools, equipment and work place. - Store tools and equipment's		knowledge: Detailed knowledge about: - Safety precautions while servicing secondary tillage machinery. - Safe handling of working tools and equipment's. - Waste disposal.	goggles. - Safety boots. - Overall. - Gloves. - Helmet.	
		(d) Dismantling tillage implements.	Discussion Guide students to define, Identify tillage implements Demonstration Guide students on how to dismantle tillage implements Activity Organize students in manageable group to	Students should be able to: - Interpret drawings. - Select tools and equipment. - Dismantle tillage implements - Observe safety precautions - Clean tools,	Tillage machines dismantled conform to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Dismantle tillage implements Principles: Students should explain the principle of: - Dismantling tillage implements Theories: Students should explain: - Procedures for dismantling tillage implements - Adjustment on each tillage implements.	The following tools, equipment and safety gears are to be available: - Mould board plough. - Disc plough. - Chisel plough. - Subsoiler. - Scrapers. - Land planners. - Disc harrow. - Spikes.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			dismantle tillage implements	equipment and work place. • Store tools and equipment's		Circumstantial knowledge: Detailed knowledge about: • Safety precautions while dismantling tillage implements. • Safe handling of working tools and equipment's. • Waste disposal.	• Spring tooth harrows. • Rotavator. • Ridger. • Field rollers. • Service manuals. • Tool kit. • Grease Gun. • Oil can. • Air compressor. • Welding machine. • Hand grinder. • Anvil. • Safety goggles. • Safety boots. • Overall. • Gloves. • Helmet.	
		(e) Assembling tillage implements	Discussion Guide students to define, identify functions of primary and secondary tillage implements	Students should be able to: • Interpret drawings. • Select tools and equipment. • Assemble	Tillage machines assembled conform to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Assemble different tillage implements Principles: Students should explain the principle of:	The following tools, equipment and safety gears are to be available: • Mould board plough. • Disc plough. • Chisel	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			Demonstration Guide students on how to assemble tillage implements Activity Organize students in manageable group to assemble tillage implements	tillage implements - Perform relevant adjustments on tillage machines. - Observe safety precautions - Test tillage machinery - Clean tools, equipment and work place. - Store tools and equipment's.		- Assembling tillage implements Theories: Students should explain: - Repair of different tillage implements. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while assembling tillage machinery. - Safe handling of working tools and equipment's. - Waste disposal.	plough. - Subsoiler. - Scrapers. - Disc harrow. - Spikes. - Spring tooth harrows. - Rotavator. - Ridger. - Field rollers. - Service manuals. - Tool kit. - Grease Gun. - Oil can. - Air compressor. - Welding machine. - Hand grinder. - Anvil. - Safety goggles. - Safety boots. - Overall. - Gloves. - Helmet.	
		(f) Servicing field rollers	Discussion Guide students to define, Identify	Students should be able to: Interpret	Serviced field rollers conform to technical	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to:	The following tools, equipment and safety gears are to be	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			function of field rollers Demonstration Guide students on how to Service field rollers Activity Organize students in manageable group to Service field rollers.	drawings. • Select tools and equipment. • Conduct inspection on field rollers. • Service field rollers. • Perform relevant adjustments on field rollers. • Observe safety precautions • Clean tools, equipment and work place. • Store tools and equipment's	specifications .	• Service field rollers. Principles: Students should explain the principle of: • Servicing field rollers. Theories: Students should explain: • Types of field rollers. • Uses of field rollers. • Circumstantial knowledge: Detailed knowledge about: • Safety precautions while servicing field rollers. • Safe handling of working tools and equipment's. • Waste disposal.	available: • Field rollers. • Service manuals. • Tool kit. • Grease Gun. • Oil can. • Air compressor. • Hand grinder. • Anvil. • Safety goggles. • Safety boots. • Overall. • Gloves. • Helmet.	
	7.2 Servicing Cultivators /	(a) Servicing weeders / cultivators	Discussion Guide students to define,	Students should be able to:	Serviced cultivators / weeders	Knowledge evidence: Detailed knowledge of: Method used: Students	The following tools, equipment and safety gears	30

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
	Weeders		Identify function of Cultivators / Weeders Demonstration Guide students on how to Service weeders / cultivators Activity Organize students in manageable group to Service weeders / cultivators	• Interpret drawings. • Select tools and equipment. • Conduct inspections on tillage machines. • Dismantle cultivators / weeders. • Service cultivators / weeders. • Assemble cultivators / weeders. • Observe safety precautions. • Clean tools, equipment and work place. • Store tools and equipment s.	conform to technical specifications .	should explain how to: • Service different cultivators / weeders. Principles: Students should explain the principle of: • Replacing worn out parts. • Servicing different types of cultivators / weeders. Theories: Students should explain: • Types of cultivators / weeders. • Uses of different cultivators / weeders. • Operation of each cultivators / weeders. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while servicing cultivators / weeders. • Safe handling of tools and	are to be available: • Spring cushioned cultivators / weeders. • Rigid weeders / cultivators. • Service manuals. • Tool kit. • Grease gun. • Oil can. • Welding machine. • Hand grinder. • Anvil. • Safety goggles. • Safety boots. • Overall. • Gloves. • Helmet.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
						equipment. • Waste disposal.		
		(b) Carrying out adjustments on the weeder	Discussion Guide students to define, identify procedures for Carry out adjustments on the weeder Demonstration Guide students on how to Carry out adjustments on the weeder Activity Organize students in manageable group to carry out adjustments on the weeder	Students should be able to: • Interpret drawings. • Select tools and equipment. • Perform relevant adjustments on cultivators / weeder. • Observe safety precautions. • Clean tools, equipment and work place. • Store tools and equipment's.	Adjusted cultivators / weeder conform to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Conduct adjustments of cultivators / weeder. Principles: Students should explain the principle of: Conducting adjustments of cultivators / weeder. Theories: Students should explain: • Adjustment on each cultivators / weeder. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while Carry out adjustments on the weeder cultivators / weeder. • Safe handling of tools and equipment.	The following tools, equipment and safety gears are to be available: • Spring cushioned cultivators / weeder. • Rigid weeder / cultivator. • Service manuals. • Tool kit. • Grease gun. • Oil can. • Welding machine. • Hand grinder. • Anvil. • Safety goggles. • Safety boots. • Overall. • Gloves. • Helmet.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
						Waste disposal.		
		(c) Testing weeders	Discussion Guide students to define, identify procedures for testing weeders Demonstration Guide students on how to test weeders Activity Organize students in manageable group to Test weeders.	Students should be able to: - Interpret drawings. - Select tools and equipment. - Observe safety precautions. - Test cultivators / weeders. - Clean tools, equipment and work place. - Store tools and equipment's.	Cultivators / weeders Tested conform to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Test different cultivators / weeders. Principles: Students should explain the principle of: - Testing weeders. Theories: Students should explain: - Procedures for testing weeders Circumstantial knowledge: Detailed knowledge about: - Safety precautions while testing cultivators / weeders. - Safe handling of tools and equipment. - Waste disposal.	The following tools, equipment and safety gears are to be available: - Spring cushioned cultivators / weeders. - Rigid weeders / cultivators. - Service manuals. - Tool kit. - Grease gun. - Oil can. - Welding machine. - Hand grinder. - Anvil. - Safety goggles. - Safety boots. - Overall. - Gloves. - Helmet.	
8.0 Maintaining Spraying	8.1 Servicing Boom	(a) Servicing pressurized sprayer	Discussion Guide students to describe	Students should be able to:	Serviced sprayers	Knowledge evidence: Detailed knowledge of: Method used: Students	The following tools, equipment and safety gears	40

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
Machinery	Sprayers		concept of pressurized sprayer Demonstrate Guide students on how to Service pressurized sprayer Activity Organize students in manageable group to Service pressurized sprayer.	- Select tools and equipment. - Inspect pressurized sprayer - Identify defects. - Service pressurized sprayer components. - Calibrate pressurized sprayer - Observe safety precautions. - Clean tools, equipment and work place. - Store tools and equipment's.	conform to technical specifications .	should explain how to: - Calibrate pressurized sprayer. Principles: Students should explain the principles of: - Maintaining pressurized sprayer. - Calibrating pressurized sprayers. Theories: Students should explain: - Components of pressurized prayers and functions. - Properties of liquids / fluids. - Factors to influence uniform spraying. - Types of spraying nozzles. - Procedure for calibrating pressurized sprayer. Circumstantial knowledge: Detailed knowledge about: Safety precautions while servicing boom sprayers.	are to be available: - Pressurized sprayers. - Service manual. - Tool kit. - Vice. - Working bench. - Pressure gauge tester. - Rate governor. - Vacuum gauge. - Oil can. - Protective gloves. - Safety goggles. - Protective masks. - Protective clothes. - Overall. - Safety boots. - Helmet.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
						- Safe handling of working tools and equipment. - Waste disposal.		
		(b) Servicing continuous sprayers	Discussion Lead students to describe concept of continuous sprayers Demonstration Guide students on how to Service continuous sprayer Activity Organize students in manageable group to Service pressurized sprayer.	Students should be able to: - Select tools and equipment. - Inspect continuous sprayer - Identify defects. - Service continuous sprayer components. - Perform adjustments on continuous sprayer. - Calibrate continuous sprayer - Observe safety precaution	Serviced continuous sprayer conform to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Service continuous sprayers. Principles: Students should explain the principles of: - Calibrating continuous sprayers. Theories: Students should explain: - Components of continuous sprayers and functions. - Procedure for calibrating continuous sprayer. Circumstantial knowledge: Detailed knowledge about: Safety precautions while servicing continuous sprayers.	The following tools, equipment and safety gears are to be available: - Continuous sprayers. - Service manual. - Tool kit. - Vice. - Working bench. - Pressure gauge tester. - Rate governor. - Vacuum gauge. - Lifting machine. - Oil can. - Protective gloves. - Safety goggles.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
				s. Clean tools, equipment and work place. - Store tools and equipment's.		- Safe handling of working tools and equipment. - Waste disposal.	- Protective masks. - Protective clothes. - Overall. - Safety boots. - Helmet.	
		(c) Servicing motorized sprayers.	Discussion Guide students to define, identify function of motorized sprayer Demonstration Guide students on how to Service motorized sprayer Activity Organize students in manageable group to Service	Students should be able to: - Select tools and equipment. - Inspect motorized s sprayer - Identify defects. - Service motorized sprayer component s. - Perform adjustment s on continuous sprayer.	Serviced s motorized sprayer conform to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Service motorized sprayers. Principles: Students should explain the principles of: - Calibrating motorized sprayers. Theories: Students should explain: - Components of motorized sprayers and functions. - Procedure for calibrating motorized sprayer. Circumstantial knowledge:	The following tools, equipment and safety gears are to be available: - Motorized sprayer. - Service manual. - Tool kit. - Vice. - Working bench. - Pressure gauge tester. - Vacuum gauge. - Lifting machine. - Pressurized water system.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			motorized sprayer.	- Calibrate continuous sprayer - Observe safety precautions. - Clean tools, equipment and work place. - Store tools and equipment's.		Detailed knowledge about: Safety precautions while servicing motorized sprayers. - Safe handling of working tools and equipment. - Waste disposal.	- Oil can. - Protective gloves. - Safety goggles. - Protective masks. - Protective clothes. - Overall. - Safety boots. - Helmet.	
	8.2 Servicing Hand Sprayers	(a) Servicing low volume hand sprayers.	Discussion Guide students to define, Identify features of low volume hand sprayers Demonstration Guide students on how to service low volume hand sprayers. Activity	Students should be able to: - Select tools and equipment. - Inspect low volume hand sprayers. - Service low volume hand sprayers.	Low volume hand sprayers. Serviced as per technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Service low volume hand sprayer - Adjust the hand sprayers. Principles: Students should explain the principle of: - Operation of low volume hand sprayers Theories: Students should:	The following tools, equipment and safety gears are to be available: - Service manual. - Tool kit. - Bench. - Vice. - Low volume hand sprayers. - Safety boots. - Special gloves.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			Organize students in manageable group to service low volume hand sprayers.	- Identify defects of sprayers. - Service sprayers and components. - Perform final adjustments. - Observe safety precautions. - Test sprayers. - Clean tools, equipment and work place. - Store tools and sprayers.		- Describe low volume hand sprayers. - Outline different categories of hand sprayer. - Describe maintenance procedure of low volume hand sprayers. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while performing service of hand sprayers. - Safe handling of working tools and equipment. - Waste disposal.	- Masks. - Safety goggles. - Protective clothes. - Helmet.	
		(b) Servicing medium volume hand sprayers.	Discussion Guide students to define, Identify features of medium	Students should be able to: Select tools and equipment.	Medium volume hand sprayers. Serviced as per technical specifications	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: Service medium volume hand	The following tools, equipment and safety gears are to be available: Service	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			volume hand sprayers Demonstrate Guide students on how to service medium volume hand sprayers Activity Organize students in manageable group to service medium volume hand sprayers.	- Inspect medium volume hand sprayers. - Service medium volume hand sprayers. - Identify defects of sprayers. - Perform final adjustment s. - Observe safety precaution s. - Test sprayers. - Clean tools, equipment and work place. - Store tools and sprayers.	.	sprayers. Principles: Students should explain the principle of: - Operation of medium volume hand sprayers. Theories: Students should: - Describe medium volume hand sprayers. - Outline different categories of hand sprayer. - Describe maintenance procedure of medium volume hand sprayers. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while performing service of hand sprayers. - Safe handling of working tools and equipment. - Waste disposal.	manual. - Tool kit. - Bench. - Vice. - Medium volume hand sprayers. - Safety boots. - Special gloves. - Masks. - Safety goggles. - Protective clothes. - Helmet.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
		(c) Servicing ultra-volume hand sprayer.	Discussion Guide students to define, Identify features of ultra-volume hand sprayers Demonstration Guide students on how to service ultra-volume hand sprayers Activity Organize students in manageable group to service ultra-volume hand sprayers.	Students should be able to: • Select tools and equipment. • Inspect ultra-volume hand sprayers. • Ultra-volume hand sprayers. • Identify defects of sprayers. • Service sprayers and components. • Perform final adjustments. • Observe safety precautions. • Test	Ultra-volume hand sprayers. Serviced as per technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Service ultra-volume hand sprayer Principles: Students should explain the principle of: • Operation of ultra-volume hand sprayers. Theories: Students should: • Describe ultra-volume hand sprayers. • Outline different categories of hand sprayer. • Describe maintenance procedure of ultra-volume hand sprayers. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while performing	The following tools, equipment and safety gears are to be available: • Service manual. • Tool kit. • Bench. • Vice. • Ultra low volume hand sprayers. • Safety boots. • Special gloves. • Masks. • Safety goggles. • Protective clothes. • Helmet.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
				sprayers. - Clean tools, equipment and work place. - Store tools and sprayers.		service of hand sprayers. - Safe handling of working tools and equipment. - Waste disposal.		
	8.3 Performing Crop Protection	(a) Carrying out integrated pest management	Discussion Guide students to define, Identify procedures for Carrying out integrated pest management Demonstration Guide students on how to Carry out integrated pest management Activity Organize students in manageable group to Carry out integrated pest	Students should be able to: - Select tools and equipment - Describe Symptom and diagnosis of infection - Carry out integrated pest management - Observe safety precautions. - Clean tools,	Crop protection performed as per technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Describe the development of Pest Principles: Students should explain the principle of: - IPM principle Theories: Students should: - Describe plant disease - Insect damage - methods of pest control - Outline different method of chemical application. - characteristics and classification of	The following tools, equipment and safety gears are to be available: - Boom sprayer/Hand sprayers. - Chemical herbicides - Insecticides - Pesticides - Fungicides - Service manual. - Tool kit. - Bench. - Vice. - Low volume hand sprayers. - Safety boots.	30

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			management	equipment and work place. • Store tools and sprayers		insects Circumstantial knowledge: Detailed knowledge about: Safety precautions while Carrying out integrated pest management • Safe handling of working tools and equipment. • Waste disposal	• Special gloves. • Masks. • Safety goggles. • Protective clothes. • Helmet.	
		(b) Performing chemical application	Discussion Guide students to define, Identify procedures for performing chemical application Demonstration Guide students on how to Perform chemical application Activity Organize students in	Students should be able to: • Select tools and equipment • Observe safety precautions. • Perform Chemical Application on crop • Clean tools, equipment and work place.	Crop protection as per technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain • Procedures for performing chemical application Principles: Students should explain the principle of: • Performing chemical application Theories: Students should: • Outline different method of chemical application.	The following tools, equipment and safety gears are to be available: • Boom sprayer/Hand sprayers. • Chemical herbicides • insecticides • pesticides • Fungicides • Service manual. • Tool kit. • Bench. • Vice.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			manageable group to Perform chemical application	Store tools and sprayers		- Describe maintenance procedure of chemical application. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while performing chemical application. - Safe handling of working tools and equipment. - Waste disposal	- Ultra low volume hand sprayers. - Medium volume hand sprayers. - Low volume hand sprayers. - Safety boots. - Special gloves. - Masks. - Safety goggles. - Protective clothes. - Helmet.	
9.0 Maintaining agricultural Processing and preservation Machines	9.1 Servicing air conditioning system	(a) Servicing air conditioning components	Discussion Guide students to define, identify agricultural processing machines and their components Demonstration Guide students on how to Service air	Students should be able to: - Select tools and equipment - Identify air conditioning main parts. - Interpret air conditioning	Air conditioning system components serviced as per technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Service air conditioning system. Principles: Students should explain the principle of: - Charging AC systems. Theories: Students should explain:	The following tools, equipment and safety gears are to be available: - Vehicle / tractor with air conditioning. - Air conditioning service equipment unit.	15

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			conditioning components Activity Organize students in manageable group to Service air conditioning components	g system circuits. • Service air conditioning components • Observe environmental and personal safety precautions. • Clean tools, equipment and work place. • Store tools, equipment and parts.		• Functions of air conditioning system components. • Layout of main components in air conditioning system. • Operation of motor vehicle cabin heating system. Circumstantial knowledge: Detailed knowledge about: Safety precautions while servicing air conditioning system components. • Safe handling of work tools, equipment and refrigerants. • Waste refrigerant disposal.	• Tool kit. • Clamp-on meter • Thermometer • Gas Leak detector. • Vacuum pump. • Air blower. • Hose pipe. • Copper tube cutter. • Air handling unit. • Tube flaring tool. • Multimeter. • Blazing rods and flux. • Wire brush.. • Extension cable. • Safety boots. • Masks. • Gloves. • Safety clear glasses. • Overall. • Helmet.	
		(b) Recharging refrigerant and	Discussion Guide students	Students should be able	Refrigerant and oil.	Knowledge evidence: Detailed knowledge of:	The following tools, equipment	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
		oil.	to define, analyze procedures for recharging refrigerant and oil Demonstration Guide students on how to Recharge refrigerant and oil, Activity Organize students in manageable group to recharge refrigerant and oil.	to: • Select tools and equipment • Locate refrigerant leaks. • Recharge refrigerant in air conditioning system. • Seal refrigerant pipes by gas welding. • Observe environmental and personal safety precautions. • Clean tools, equipment and work place. • Store tools, equipment and parts.	Recharged as per technical specifications .	Method used: Students should explain how to: • Recharge refrigerant and oil Principles: Students should explain the principle of: • Recharging refrigerant and oil. Theories: Students should explain: • Procedures for Recharging refrigerant and oil Circumstantial knowledge: Detailed knowledge about: • Safety precautions while servicing air conditioning system components • Safe handling of work tools, equipment and refrigerants. • Waste refrigerant disposal.	and safety gears are to be available: • Vehicle / tractor with air conditioning. • Air condition service equipment unit. • Tool kit. • Clamp-on meter. • Thermometer • Gas Leak detector. • Air handling unit. • Tube flaring tool. • Multimeter. • Safety boots. • Masks • Gloves. • Safety clear glasses. • Overall. • Helmet.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
		(c) Servicing heating system.	Discussion Guide students to define, identify function of heating system Demonstration Guide students on how to Service heating system Activity Organize students in manageable group to service heating system.	Students should be able to: • Select tools and equipment. • Service heating system. • Observe environmental and personal safety precautions. • Clean tools, equipment and work place. • Store tools, equipment and parts.	Heating system Serviced as per technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Service heating system Principles: Students should explain the principle of: • Heating and ventilation systems. Theories: Students should explain: • Functions of heating system Circumstantial knowledge: Detailed knowledge about: Safety precautions while servicing air conditioning system components. • Safe handling of work tools, equipment and refrigerants. • Waste refrigerant disposal.	The following tools, equipment and safety gears are to be available: • Service manual. • Vehicle / tractor with air conditioning. • Air condition service equipment unit. • Tool kit. • Clamp-on meter. • Oxy-acetylene gas cylinders and accessories. • Junior hacksaw. • Knife. • Thermometer • Gas Leak detector. • Hose pipe. • Copper tube cutter.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
							• Multimeter. • Blazing rods and flux. • Safety boots. • Masks. • Gloves. • Safety clear glasses. • Overall. • Helmet.	
	9.2 Performing Shellers and Threshers Machine	(a) Servicing electrical driven shellers / threshers	Discussion Guide students to describe Sheller machine Demonstrate Guide students on how to Service electrical driven shellers / threshers Activity Organize students in manageable group to Service electrical driven shellers / threshers.	Students should be able to: • Interpret drawings. • Select tools, equipment and materials. • Service the Sheller / threshers. • Observe safety precautions. • Test shellers and threshers	Serviced electrical driven shellers and threshers conform to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Service different shellers and threshers. Principles: Students should explain the principle of: • Servicing different shelling and threshing machines. Theories: Students should explain: • Types of shelling and threshing machines. • Use of different shelling and threshing machines.	The following tools, equipment and safety gears are to be available: • Electrical driven Sheller / threshers. • Tool kit. • Jack. • Lifting stand • Trolley. • Multimeter. • Grease gun. • Oil can. • Welding machines. • Air compressors • Safety goggles.	15

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
				• Clean tools and equipment and work place. • Store tools and equipment.		• Adjustment for shellers and threshers. • Service of shellers and threshers. • Operation of shellers and threshers. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while servicing shellers and threshers. • Safe handling of working tools and equipment. • Waste disposal.	• Safety boots. • Overall. • Gloves. • Helmet.	
		(b) Servicing engine driven shellers / threshers	Discussion Guide students to describe concept of engine driven shellers / threshers. Demonstrate Guide students on how to Service engine	Students should be able to: • Interpret drawings. • Select tools, equipment and materials. • Service the Sheller /	Serviced engine driven shellers and threshers conform to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Service different engine driven shellers and threshers. Principles: Students should explain the principle of: • Servicing different	The following tools, equipment and safety gears are to be available: • Engine driven Sheller/ threshers. • Tool kit. • Jack. • Lifting stand • Trolley.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			driven shellers / threshers Activity Organize students in manageable group to Service engine driven shellers / threshers	thresher. - Observe safety precautions. - Test shellers and threshers - Clean tools and equipment and work place. - Store tools and equipment.		engine driven shelling and threshing machines. Theories: Students should explain: - Procedures for servicing engine driven shellers and threshers Circumstantial knowledge: Detailed knowledge about: - Safety precautions while servicing shellers and threshers. - Safe handling of working tools and equipment. - Waste disposal.	- Multimeter. - Grease gun. - Oil can. - Welding machines. - Air compressors - Safety goggles. - Safety boots. - Overall. - Gloves. - Helmet.	
		(c) Service manual operated shellers / threshers.	Discussion Guide students to define, identify function of manual operated shellers / threshers Practical work	Students should be able to: - Interpret drawings. - Select tools, equipment and materials. - Service the	Serviced manual operated shellers and threshers conform to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Replace the worn out parts. Principles: Students should explain the principle of: - Servicing manual operated shelling	The following tools, equipment and safety gears are to be available: - Manual driven Sheller / threshers. - Tool kit. - Jack. - Lifting stand	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			Guide students on how to Service manual operated shellers / threshers Activity Organize students in manageable group to Service manual operated shellers / threshers.	Sheller / thresher. - Observe safety precautions. - Test shellers and threshers - Clean tools and equipment and work place. - Store tools and equipment.		and threshing machines. Theories: Students should explain: - Service manual operated shellers and threshers. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while servicing shellers and threshers. - Safe handling of working tools and equipment. - Waste disposal.	- Trolley. - Multimeter. - Grease gun. - Oil can. - Welding machines. - Air compressors. - Safety goggles. - Safety boots. - Overall. - Gloves. - Helmet.	
	9.3 Performing maintenance Of pulping machines	(a) Servicing engine driven pulpers	Discussion Guide students to define, Identify function of pulper Demonstrate Guide students on how to Service engine driven pulpers	Students should be able to: - Interpret drawings. - Select tools, equipment and materials. - Conduct inspection to pulpers.	Serviced pulping machines conform to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Service engine driven pulping machines. Principles: Students should explain the principle of: - Servicing engine driven pulpers Theories: Students	The following tools, equipment and safety gears are to be available: - Engine driven pulpers. - Tool kit. - Step ladder. - Jack. - Grease gun. - Trolley stand - Service	28

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			Activity Organize students in manageable group to Service engine driven pulpers.	• Service pulper. • Observe safety precautions. • Test pulping machine. • Clean tools, equipment and work place. • Store tools and equipment.		should explain: • Types of pulping machines. • Use of different pulpers • Adjustment on pulpers • Service of pulpers. • Operation of engine driven pulper. Circumstantial knowledge: Detailed knowledge about: • Safety precaution while performing maintenance of pulping machines. • Safe handling of working tools and equipment. • Waste disposal.	manuals. • Oil can. • Welding machines. • Air compressors • Safety goggles. • Safety boots. • Overall. • Gloves. • Helmet.	
		(b) Repairing motor driven pulpers	Discussion Guide students to describe concept of motor driven pulpers Practical work Guide students on how to	Students should be able to: • Interpret drawings. • Select tools, equipment and materials.	Motor driven pulping machines repaired conform to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Conduct adjustments on pulping machines. • Replace worn out parts. Principles: Students	The following tools, equipment and safety gears are to be available: • Motor driven pulper. • Tool kit. • Step ladder.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			Service motor driven pulpers Activity Organize students in manageable group to Service motor driven pulpers.	- Repair motor driven pulpers. - Perform relevant adjustment on pulping machines - Observe safety precautions. - Test pulping machine. - Clean tools, equipment and work place. - Store tools and equipment.		should explain the principle of: - Repairing motor driven pulper Theories: Students should explain: - Service of pulpers. - Operation of each pulper. Circumstantial knowledge: Detailed knowledge about: - Safety precaution while performing maintenance of pulping machines. - Safe handling of working tools and equipment. - Waste disposal.	- Jack. - Grease gun. - Trolley stand - Service manuals. - Oil can. - Welding machines. - Air compressors - Safety goggles. - Safety boots. - Overall. - Gloves. - Helmet.	
		(c) Servicing manual operated pulpers.	Discussion Guide students to define terms, identify function of pulper Demonstrate	Students should be able to: - Interpret drawings. - Select tools, equipment	Serviced manual operated pulping machines conform to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: Service manual operated pulping machines. Principles: Students	The following tools, equipment and safety gears are to be available: Manual / hand operated pulper.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			Guide students on how to Service manual operated pulpers Activity Organize students in manageable group to Service manual operated pulpers	and materials. • Conduct inspection to pulpers. • Service pulper. • Observe safety precautions. • Test pulping machine. • Clean tools, equipment and work place. • Store tools and equipment.	.	should explain the principle of: • Conducting adjustments. Theories: Students should explain: • Procedures for servicing manual operated pulpers. Circumstantial knowledge: Detailed knowledge about: • Safety precaution while performing maintenance of pulping machines. • Safe handling of working tools and equipment. • Waste disposal.	• Tool kit. • Step ladder. • Jack. • Grease gun. • Trolley stand • Service manuals. • Oil can. • Welding machines. • Air compressors • Safety goggles. • Safety boots. • Overall. • Gloves. • Helmet.	
		(d) Dismantling pulpers.	Discussion Guide students to describe procedures for dismantling pulpers Demonstration Guide students on how to	Students should be able to: • Interpret drawings. • Select tools, equipment and materials.	Pulping machines dismantled conform to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Dismantle pulping machines. Principles: Students should explain the principle of: • Dismantling	The following tools, equipment and safety gears are to be available: • Engine driven pulpers. • Motor driven pulper. • Manual /	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			dismantle pulpers Activity Organize students in manageable group to Service engine driven pulpers.	- Dismantle pulpers - Observe safety precautions. - Clean tools, equipment and work place. - Store tools and equipment.		pulping machines Theories: Students should explain: - Procedures for dismantling pulping machines Circumstantial knowledge: Detailed knowledge about: - Safety precaution while dismantling pulping machines. - Safe handling of working tools and equipment. - Waste disposal.	hand operated pulper. - Tool kit. - Step ladder. - Jack. - Grease gun. - Trolley stand - Service manuals. - Oil can. - Air compressors - Safety goggles. - Safety boots. - Overall. - Gloves. - Helmet.	
		(e) Assembling pulpers	Discussion Guide students to describe procedures for assembling pulpers Demonstrate Guide students on how to Service engine driven pulpers	Students should be able to: - Interpret drawings. - Select tools, equipment and materials. - Conduct inspection to pulpers.	Pulping machines assembled conform to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Assemble pulping machine Principles: Students should explain the principle of: - Assembling pulping machine Theories: Students should explain:	The following tools, equipment and safety gears are to be available: - Engine driven pulpers. - Motor driven pulper. - Manual / hand operated pulper.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			Activity Organize students in manageable group to Service engine driven pulpers.	- Assemble pulper components. - Observe safety precautions. - Test pulping machine. - Clean tools, equipment and work place. - Store tools and equipment.		- Procedures for assembling of pulpers. Circumstantial knowledge: Detailed knowledge about: - Safety precaution while performing maintenance of pulping machines. - Safe handling of working tools and equipment. - Waste disposal.	- Tool kit. - Step ladder. - Jack. - Grease gun. - Trolley stand - Service manuals. - Oil can. - Welding machines. - Air compressors - Safety goggles. - Safety boots. - Overall. - Gloves. - Helmet.	
		(f) Carrying out relevant adjustments on machines.	Discussion Guide students to describe procedures for carrying out relevant adjustments on machines Practical work Guide students on how to carry out relevant	Students should be able to: - Interpret drawings. - Select tools, equipment and materials. - Conduct inspection to pulpers.	Adjustment carried out on different machines conform to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Conduct adjustments on machines. - Replace worn out parts. Principles: Students should explain the principle of: - Conducting	The following tools, equipment and safety gears are to be available: - Engine driven pulpers. - Motor driven pulper. - Manual / hand operated pulper. - Tool kit.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			adjustments on machines Activity Organize students in manageable group to carry out relevant adjustments on machines	- Perform relevant adjustment on machines - Observe safety precautions. - Test pulping machine. - Clean tools, equipment and work place. - Store tools and equipment.		adjustments on machines Theories: Students should explain: - Procedures for conducting adjustment on machines Circumstantial knowledge: Detailed knowledge about: - Safety precaution while performing Carry out relevant adjustments on machines. - Safe handling of working tools and equipment. - Waste disposal.	- Step ladder. - Jack. - Grease gun. - Trolley stand - Service manuals. - Oil can. - Welding machines. - Air compressors. - Safety goggles. - Safety boots. - Overall. - Gloves. - Helmet.	
	9.4Performing maintenance Of decorticating machines	(a) Servicing decorticators	Discussion Guide students to describe concept of decorticator Demonstrate Guide students on how to Service decorticators	Students should be able to: - Interpret drawings. - Select tools, equipment and materials.	Serviced decorticating machines conform to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Replace worn out parts. - Service decorticating machines Principles: Students should explain the	The following tools, equipment and safety gears are to be available: - Engine driven decorticator. - Motor driven decorticator. - Hand or	18

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			Activity Organize students in manageable group to Service decorticators	- Conduct inspection. - Service decorticator. - Observe safety precautions. - Test decorticator. - Clean tools, equipment and work place. - Store tools and equipment.		principle of: - Replacing worn out parts. - Servicing decorticators. Theories: Students should explain: - Types of decorticating machines. - Use of different decorticators. - Operation of each decorticator. Circumstantial knowledge: Detailed knowledge about: - Safety precaution while performing maintenance of decorticating machines. - Safe handling of working tools and equipment. - Waste disposal.	manual operated decorticator. - Tool kit. - Step ladder. - Jack. - Lifting stand. - Trolley. - Service manual. - Multimeter. - Grease gun. - Oil can. - Welding machine. - Air compressor. - Safety goggles. - Safety boots. - Overall. - Gloves. - Helmet.	
		(b) Carrying out relevant adjustments on decorticators.	Discussion Guide students to describe procedures for Carrying out	Students should be able to: Interpret drawings.	Relevant adjustments on decorticator's machines	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: Conduct	The following tools, equipment and safety gears are to be available:	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			relevant adjustments on decorticators Demonstration Guide students on how to Carrying out relevant adjustments on decorticators Activity Organize students in manageable group to carrying out relevant adjustments on decorticators	- Select tools, equipment and materials. - Perform relevant adjustment - Observe safety precautions. - Test decorticator. - Clean tools, equipment and work place. - Store tools and equipment.	conform to technical specifications .	adjustments on decorticating machines. Principles: Students should explain the principle of: - Decorticating adjustments. Theories: Students should explain: - Adjustment on decorticators. Circumstantial knowledge: Detailed knowledge about: - Safety precaution while performing maintenance of decorticating machines. - Safe handling of working tools and equipment. - Waste disposal.	- Engine driven decorticator. - Motor driven decorticator. - Hand or manual operated decorticator. - Tool kit. - Step ladder. - Jack. - Lifting stand. - Trolley - Service manual. - Multimeter. - Grease gun. - Oil can. - Welding machine. - Air compressor. - Safety goggles. - Safety boots. - Overall. - Gloves. - Helmet.	
		(c) Dismantling decorticator machines.	Discussion Guide students to describe	Students should be able to:	Dismantled decorticating machines	Knowledge evidence: Detailed knowledge of: Method used: Students	The following tools, equipment and safety gears	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			procedures for dismantling decorticator machines Demonstration Demonstrate to students on how to dismantle decorticator machines Activity Organize students in manageable group to dismantle decorticator machines.	• Interpret drawings. • Select tools, equipment and materials. • Dismantle the decorticator. • Observe safety precautions. • Clean tools, equipment and work place. • Store tools and equipment.	conform to technical specifications	should explain how to: • Dismantle decorticator machines. Principles: Students should explain the principle of: Dismantling decorticator machines. Theories: Students should explain: • Dismantling decorticator machines. Circumstantial knowledge: Detailed knowledge about: • Safety precaution while performing maintenance of decorticating machines. • Safe handling of working tools and equipment. • Waste disposal.	are to be available: • Engine driven decorticator. • Motor driven decorticator. • Hand or manual operated decorticator. • Tool kit. • Step ladder. • Jack. • Lifting stand. • Trolley. • Service manual. • Multimeter. • Grease gun. • Oil can. • Welding machine. • Air compressor. • Safety goggles. • Safety boots. • Overall. • Gloves. • Helmet.	
		(d) Assembling	Discussion	Students	Serviced	Knowledge evidence:	The following	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
		decorticator machines.	Guide students to describe procedures for assembling decorticator machines Demonstration Guide students on how to assemble decorticator machines Activity Organize students in manageable group to assemble decorticator machines.	should be able to: • Interpret drawings. • Select tools, equipment and materials. • Assemble decorticator components. • Observe safety precautions. • Test decorticator. • Clean tools, equipment and work place. • Store tools and equipment.	decorticator machines conform to technical specifications.	Detailed knowledge of: Method used: Students should explain how to: • Assemble decorticator components. Principles: Students should explain the principle of: • Assembling decorticator components. Theories: Students should explain: Procedures for assembling decorticator components. Circumstantial knowledge: Detailed knowledge about: • Safety precaution while assembling of decorticator machines. • Safe handling of working tools and equipment. • Waste disposal.	tools, equipment and safety gears are to be available: • Engine driven decorticator. • Motor driven decorticator. • Hand or manual operated decorticator. • Tool kit. • Step ladder. • Jack. • Lifting stand. • Trolley. • Service manual. • Multimeter. • Grease gun. • Oil can. • Welding machine. • Air compressor. • Safety goggles. • Safety boots. • Overall.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
							- Gloves. - Helmet.	
	9.5 Service Milking Machines	(a) Carrying out adjustments on milking machines	Discussion Guide students to describe concept of milking Machines Demonstration Guide students on how to Milking Machines Activity Organize students in manageable group to carry out adjustments on milking machines	Students should be able to: - Interpret drawings. - Select tools and equipment. - Inspect milking machines - Perform adjustments on machines - Observe safety precautions. - Clean tools and equipment. - Store tools and equipment.	Adjusted milking machines conform to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Carry out adjustments on milking machines - Operate milking machines. Principles: Students should explain the principle of: - Carrying out adjustments on milking machines Theories: Students should explain: - Types of milking machines. - Types of small scale milking machines. - Function of milking machine components. - Operation of milking plants. - Effects of heat in milk storage. - Effect of pressure	The following tools, equipment and safety gears are to be available: - Small scale milking machines. - Milking parlour. - Tool kit. - Multimeter. - Pipe wrenches. - Work bench. - Vice. - Service manual. - Tap and dies. - Tape measure. - Pressure gauge. - Vacuum gauge. - Thermometer - Hacksaw. - Overall. - Gloves.	24

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
						in milking system. • Effects of vacuum in milking system. Circumstantial knowledge: Detailed knowledge about: - Safety precaution while servicing milking machines. - Safe handling of working tools and equipment. - Waste disposal.	- Safety glasses. - Safety boot. - Helmet.	
		(b) Testing milking machine	Discussion Guide students to define, identify procedures for testing milking Machines Demonstration Guide students on how to Test milking machine Activity Organize students in manageable	Students should be able to: - Interpret drawings. - Select tools and equipment. - Inspect milking machines - Observe safety precautions. - Test milking machines	Tested milking machines conform to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Test milking machine Principles: Students should explain the principle of: - Test milking machine Theories: Students should explain: - Procedures for Testing milking machine Circumstantial knowledge:	The following tools, equipment and safety gears are to be available: - Small scale milking machines. - Milking parlour. - Tool kit. - Multimeter. - Pipe wrenches. - Work bench. - Vice. - Service	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			group to Test milking machine	• Clean tools and equipment. • Store tools and equipment.		Detailed knowledge about: • Safety precaution while testing milking machine • Safe handling of working tools and equipment. • Waste disposal.	manual. • Tap and dies. • Tape measure. • Pressure gauge. • Vacuum gauge. • Thermometer • Hacksaw. • Overall. • Gloves. • Safety glasses. • Safety boot. • Helmet.	
		(c) Carrying out maintenance of milking machine	Discussion Guide students to define, Identify procedures for Carry out maintenance of milking machine Demonstrate Guide students on how to Carry out maintenance of milking	Students should be able to: • Interpret drawings. • Select tools and equipment • maintenance of milking machine • Inspect milking machines	Milking machines maintained to conform to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Carry out maintenance of milking machine. Principles: Students should explain the principle of: • Carrying out maintenance of milking machine. Theories: Students should explain:	The following tools, equipment and safety gears are to be available: • Small scale milking machines. • Milking parlour. • Tool kit. • Multimeter. • Pipe wrenches. • Work bench.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			machine Activity Organize students in manageable group to Carry out maintenance of milking machine	- Observe safety precautions. - Clean tools and equipment - Store tools and equipment.		- How to carry out maintenance of milking machine. Circumstantial knowledge: Detailed knowledge about: - Safety precaution while Carry out maintenance of milking machine - Safe handling of working tools and equipment. - Waste disposal.	- Vice. - Service manual. - Tap and dies. - Tape measure. - Pressure gauge. - Vacuum gauge. - Thermometer - Hacksaw. - Overall. - Gloves. - Safety glasses. - Safety boot. - Helmet.	
		(d) Carrying out service of cleaning automation system	Discussion Guide students to define, Identify procedures for Carry out service of cleaning automation system machine Demonstration Guide students	Students should be able to: - Interpret drawings. - Select tools and equipment - Inspect milking machines. - Carry out service of	Automation systems conform to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Service milking machines. - Maintain automation milking system. Principles: Students should explain the principle of: - Maintaining	The following tools, equipment and safety gears are to be available: - Small scale milking machines. - Milking parlour. - Tool kit. - Multimeter. - Pipe	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			on how to carry out service of cleaning automation system Activity Organize students in manageable group to carry out service of cleaning automation system	cleaning automation system - Observe safety precautions. - Clean tools and equipment - Store tools and equipment.		automation milking system. Theories: Students should explain: - How to service automation milking system. Circumstantial knowledge: Detailed knowledge about: - Safety precaution while Carrying out service of cleaning automation system. - Safe handling of working tools and equipment. - Waste disposal.	wrenches. - Work bench. - Vice. - Service manual. - Thermometer - Overall. - Gloves. - Safety glasses. - Safety boot. - Helmet.	
		(e) Carrying out service of feed distribution system.	Discussion Guide students to concept of feed distribution system Demonstration Guide students on how to Carry out service of feed distribution	Students should be able to: - Interpret drawings. - Select tools and equipment - Service feed distribution system. - Carry out	Feed distribution system conform to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Carry out service of feed distribution system. Principles: Students should explain the principle of: - Servicing feed distribution system. Theories: Students	The following tools, equipment and safety gears are to be available: - Small scale milking machines. - Milking parlour. - Tool kit. - Multimeter. - Pipe	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			system Activity Organize students in manageable group to carry out service of feed distribution system.	service of feed distribution system. - Observe safety precautions. - Clean tools and equipment - Store tools and equipment.		should explain: - Procedures for carrying out service of feed distribution system. Circumstantial knowledge: Detailed knowledge about: - Safety precaution while Carry out service of feed distribution system. - Safe handling of working tools and equipment. - Waste disposal.	wrenches. - Work bench. - Vice. - Service manual. - Tap and dies. - Tape measure. - Pressure gauge. - Vacuum gauge. - Thermometer - Hacksaw. - Overall. - Gloves. - Safety glasses. - Safety boot. - Helmet.	
		(f) Carrying out service of milking system	Brainstorm Guide students to identify procedures for Carry out service of milking system Demonstrate Guide students on how to	Students should be able to: - Interpret drawings. - Select tools and equipment - Inspect milking machines.	Serviced milking machines conform to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Service milking machines. Principles: Students should explain the principle of: - Servicing milking machine.	The following tools, equipment and safety gears are to be available: - Small scale milking machines. - Milking parlour. - Tool kit.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			Carry out service of milking machine Activity Organize students in manageable group to Carry out service of milking system	- Service n milking system. - Observe safety precautions. - Clean tools and equipment - Store tools and equipment		Theories: Students should explain: - Procedures for servicing milking machines. Circumstantial knowledge: Detailed knowledge about: - Safety precaution while servicing milking machines. - Safe handling of working tools and equipment. - Waste disposal.	- Multimeter. - Pipe wrenches. - Work bench. - Vice. - Service manual. - Tap and dies. - Tape measure. - Pressure gauge. - Vaccum gauge. - Thermometer - Hacksaw. - Overall. - Gloves. - Safety glasses. - Safety boot. - Helmet.	
	9.6 Servicing Feed Mixer	(a) Carrying out adjustment on feed mixers	Question and answer Guide students to define, Identify procedures for Carry out adjustment on	Students should be able to: - Interpret drawings. - Select tools, equipment	Adjusted feed mixer conforms to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: Conduct adjustments on feed mixer. Principles: Students	The following tools, equipment and safety gears are to be available: Feed mixer engine driven.	15

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			feed mixers Demonstration Demonstrate to students on how to carry out adjustment on feed mixers Practical Organize students in manageable group to carry out adjustment on feed mixers.	and materials. • Conduct inspection • Perform relevant adjustments. • Observe safety precautions. • Test feed mixer. • Clean tools and equipment • Clean work place. • Store tools and equipment		should explain the principle of: • Conducting adjustments. Theories: Students should explain: • Types of feed mixers. • Use of different feed mixers. • Adjustment on feed mixers. • Operation of feed mixers. Circumstantial knowledge: Detailed knowledge about: Safety precaution while servicing feed mixers. • Safe handling of working tools and equipment. • Waste disposal.	• Feed mixer motor driven. • Manual feed mixer. • Service manual. • Tool kit. • Lifting stand. • Trolley. • Jack. • Multimeter. • Grease gun. • Oil can. • Welding machine. • Air compressor. • Safety goggles. • Safety boots. • Overall. • Gloves. • Helmet.	
		(b) Operating feed mixers.	Discussion Guide students to define, Identify procedures for Operating feed mixers.	Students should be able to: • Interpret drawings. • Select tools, equipment	Feed mixer operation conforms to technical rules and regulations.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Operate feed mixers Principles: Students should explain the	The following tools, equipment and safety gears are to be available: • Feed mixer engine driven.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			Demonstration Demonstrate to students on how to Operate feed mixers. Practical Organize students in manageable group to Operate feed mixers.	and materials. - Conduct inspection - Operate feed mixers - Observe safety precautions. - Clean tools and equipment. - Clean work place. - Store tools and equipment.		principle of: - Operating feed mixers adjustments. Theories: Students should explain: - Operation of feed mixers. Circumstantial knowledge: Detailed knowledge about: - Safety precaution while servicing feed mixers - Safe handling of working tools and equipment. - Waste disposal.	- Feed mixer motor driven. - Manual feed mixer. - Service manual. - Tool kit. - Lifting stand. - Trolley. - Jack. - Multimeter - Grease gun. - Oil can. - Welding machine. - Air compressor. - Safety goggles. - Safety boots. - Overall. - Gloves. - Helmet.	
		(c) Carrying out maintenance of feed mixers	Discussion Guide students to identify procedures for maintenance of feed mixers Demonstration Demonstrate to	Students should be able to: - Interpret drawings. - Select tools, equipment	Mixer maintained conforms to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: Conduct maintenance of feed mixers Principles: Students	The following tools, equipment and safety gears are to be available: Feed mixer engine driven.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			students on how to Operate feed mixers. practical Organize students in manageable group to maintain feed mixers	and materials. • Conduct inspection • Observe safety precautions. • Carry out maintenance of feed mixers • Test feed mixer. • Clean tools and equipment • Clean work place. • Store tools and equipment		should explain the principle of: • Carry out maintenance of feed mixers Theories: Students should explain: • Procedures for maintaining of feed mixers. Circumstantial knowledge: Detailed knowledge about: • Safety precaution while maintaining feed mixers. • Safe handling of working tools and equipment. • Waste disposal.	• Feed mixer motor driven. • Manual feed mixer. • Service manual. • Tool kit. • Lifting stand. • Trolley. • Jack. • Multimeter. • Grease gun. • Oil can. • Welding machine. • Air compressor. • Safety goggles. • Safety boots. • Overall. • Gloves. • Helmet.	
	9.7 Servicing Choppers	(a) Carrying out adjustment on choppers	Discussion Guide students to describe choppers Practical work Guide students on how to carry	Students should be able to: • Interpret drawings. • Select tools, equipment	Adjusted chopper machines conforms to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Conduct machine adjustments. • Test choppers. Principles: Students	The following tools, equipment and safety gears are to be available: • Choppers. • Tool kit • Service	15

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			out adjustment on choppers Activity Organize students in manageable group to carry out adjustment on choppers	and materials. - Inspect choppers. - Conduct adjustment s on machines. - Observe safety precaution s. - Test choppers. - Clean tools, equipment and work place. - Store tools and equipment.		should explain the principle of: - Conducting adjustments. Theories: Students should explain: - Types of choppers. - Function of chopper components. - Procedures of servicing choppers. - Repair of different choppers. - Importance of friction and speed of the machine. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while servicing choppers. - Safe handling of working tools and equipment. - Waste disposal.	manual - Tool kit. - Hacksaw. - Grease pump. - Oil can. - Welding machine. - Trolley stand. - Work bench - Bench grinder machine - Safety goggles. - Safety boots. - Overall. - Gloves. - Helmet.	
		(b) Operating chopper	Brainstorm Guide students to define, Identify	Students should be able to: Interpret	Chopper operated conforms to technical	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to:	The following tools, equipment and safety gears are to be	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			procedures for Operating chopper Practical work Guide students on how to Operate chopper Activity Organize students in manageable group to Operate chopper	drawings. - Select tools, equipment and materials. - Inspect choppers. - Operate choppers. - Observe safety precautions. - Test choppers. - Clean tools, equipment and work place. - Store tools and equipment.	rules and regulation	- Operate choppers Principles: Students should explain the principle of: - Chopper operations. Theories: Students should explain: - Procedures of operating choppers. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while servicing choppers. - Safe handling of working tools and equipment. - Waste disposal.	available: - Choppers. - Tool kit - Service manual - Tool kit. - Hacksaw. - Grease pump. - Oil can. - Welding machine. - Trolley stand. - Work bench - Bench grinder machine - Safety goggles. - Safety boots. - Overall. - Gloves. - Helmet.	
		(c) Carrying out maintenance of choppers.	Discussion Guide students to define, Identify procedures for Carry out maintenance of	Students should be able to: - Interpret drawings. - Select tools,	Serviced chopper conforms to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Service choppers. - Conduct machine adjustments.	The following tools, equipment and safety gears are to be available: - Choppers. - Tool kit	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			choppers Demonstration Guide students on how to Carry out maintenance of choppers Activity Organize students in manageable group to Carry out maintenance of choppers.	equipment and materials. - Inspect choppers. - Dismantle choppers. - Service choppers component s. - Assemble choppers component s. - Observe safety precaution s. - Test choppers. - Clean tools, equipment and work place. - Store tools and equipment.		- Test choppers. Principles: Students should explain the principle of: - Servicing choppers. - Conducting adjustments. - Chopper operations. Theories: Students should explain: Procedures for Carry out maintenance of choppers. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while servicing choppers. - Safe handling of working tools and equipment. - Waste disposal.	- Service manual - Tool kit. - Hacksaw. - Grease pump. - Oil can. - Welding machine. - Trolley stand. - Work bench - Bench grinder machine - Safety goggles. - Safety boots. - Overall. - Gloves. - Helmet.	
	9.8 Servicing Grain Processing Machines	(a) Servicing milling machine.	Discussion Guide students to define,	Students should be able to:	Serviced milling machine	Knowledge evidence: Detailed knowledge of: Method used: Students	The following tools, equipment and safety gears	24

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			Identify function of milling machine Demonstration Guide students on how to Service milling machine Activity Organize students in manageable group to Service milling machine.	• Interpret drawings. • Select tools and materials. • Inspect milling machine • Service grain milling machine • Perform final adjustments. • Observe safety precautions. • Test milling machine. • Clean tools, equipment and work place. • Store tools and equipment.	conform to technical specifications .	should explain how to: • Service grain milling machine • Adjust milling machine machines. Principles: Students should explain the principle of: • Operating milling machine machines. • Servicing milling machine • Adjustments of milling machine Theories: Students should explain: • Types of grain processing machines. • Functions of different components of milling machine. • Use of different power sources to grain processing machines. • Procedures for servicing milling machine. Circumstantial knowledge:	are to be available: • Engine driven milling machines. • Motor driven milling machines. • Tool kit. • Lifting stand. • Trolley. • Service manual. • Multimeter. • Grease gun. • Oil can. • Welding machine. • Air compressor. • Safety goggles. • Safety boots. • Overall. • Gloves. • Helmet.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
						Detailed knowledge about: • Safety precautions while servicing milling machine • Safe handling of working tools and equipment. • Waste disposal.		
		(b) Servicing hulling machine.	Discussion Guide students to define, Identify function of hulling machine Demonstration Guide students on how to Service hulling machine Activity Organize students in manageable group to Service milling machine.	Students should be able to: • Interpret drawings. • Select tools and materials. • Inspect hulling machine. • Service hulling machine. • Perform final adjustment s. • Observe safety precaution s. • Test	Serviced hulling machine. Conform to technical rules and regulations	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Service hulling machine. • Adjust grain processing machines. Principles: Students should explain the principle of: • Operating hulling machine. • Servicing hulling machine. • Adjustments of hulling machines Theories: Students should explain: • Types of hulling machine. • Functions of	The following tools, equipment and safety gears are to be available: • Motor and engine driven hulling machine. • Motor and engine driven grain cleaning machines. • Tool kit. • Lifting stand. • Trolley. • Service manual. • Multimeter. • Grease gun. • Oil can.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
				hulling machine. • Clean tools, equipment and work place. • Store tools and equipment.		different components of hulling machine. • Use of different power sources to grain processing machines. • Procedures for servicing hulling machine. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while servicing hulling machines. • Safe handling of working tools and equipment. • Waste disposal.	• Welding machine. • Air compressor. • Safety goggles. • Safety boots. • Overall. • Gloves. • Helmet.	
		(c) Servicing polishing machine	Discussion Guide students to define, Identify function of polishing machine. Demonstration Guide students on how to service	Students should be able to: • Interpret drawings. • Select tools and materials. • Inspect grain processing	Serviced polishing machine. Conform to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Service polishing machine. • Adjust polishing machine. • Principles: Students should explain the	The following tools, equipment and safety gears are to be available: • Motor and engine driven polishing machines. • Tool kit. • Lifting stand.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			polishing machine. Activity Organize students in manageable group to service polishing machine.	machines. • Service polishing machine. • Perform final adjustments. • Observe safety precautions. • Test polishing machine.. • Clean tools, equipment and work place. • Store tools and equipment.		principle of: • Operating polishing machine. • Servicing polishing machine. • Adjustments of polishing machines. Theories: Students should explain: • Types of polishing machines. • Functions of different components of polishing machines. • Use of different power sources to grain processing machines. • Procedures for servicing polishing machines. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while servicing polishing machines. • Safe handling of working tools and equipment.	• Trolley. • Service manual. • Multimeter. • Grease gun. • Oil can. • Welding machine. • Air compressor. • Safety goggles. • Safety boots. • Overall. • Gloves. • Helmet.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
						Waste disposal.		
		(d) Dismantling hulling and milling machine	Discussion Guide students to define, identify procedures for dismantling hulling and milling machine Demonstration Guide students on how to Dismantle hulling and milling machine Activity: Organize students in manageable group to Dismantle hulling and milling machine	Students should be able to: - Interpret drawings. - Select tools and materials. - Inspect grain processing machines. - Dismantle hulling and milling machine. - Observe safety precautions. - Clean tools, equipment and work place. - Store tools and equipment.	Dismantled hulling and milling machine conform to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Dismantle hulling and milling machine machines. Principles: Students should explain the principle of: Dismantling hulling and milling machine Theories: Students should explain: - Procedures for Dismantle hulling and milling machine Circumstantial knowledge: Detailed knowledge about: - Safety precautions while Dismantle hulling and milling machine - Safe handling of working tools and equipment. - Waste disposal.	The following tools, equipment and safety gears are to be available: - Engine driven milling machines. - Motor driven milling machines. - Motor and engine driven hulling machine. - Tool kit. - Lifting stand. - Trolley. - Service manual. - Multimeter. - Grease gun. - Oil can. - Welding machine. - Air compressor. - Safety goggles. - Safety boots.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
							• Overall. • Gloves. • Helmet.	
		(e) Assembling hulling and milling.	Discussion Guide students to define, Identify procedures for assembling hulling and milling machine Demonstrate Guide students on how to assembling hulling and milling machine Activity Organize students in manageable group to assemble hulling and milling machine	Students should be able to: • Interpret drawings. • Select tools and materials. • Assemble hulling and milling machine • Perform final adjustments. • Observe safety precautions. • Clean tools, equipment and work place. • Store tools and equipment.	Assembled hulling and milling machine conform to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Assemble hulling and milling machine Principles: Students should explain the principle of: • assembling hulling and milling machine Theories: Students should explain: • Procedures for Assembling hulling and milling machine Circumstantial knowledge: Detailed knowledge about: • Safety precautions while servicing grain processing machines. • Safe handling of	The following tools, equipment and safety gears are to be available: • Engine driven milling machines. • Motor driven milling machines. • Motor and engine driven hulling machine. • Tool kit. • Lifting stand. • Trolley. • Service manual. • Multimeter. • Grease gun. • Oil can. • Welding machine. • Air compressor. • Safety	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
						working tools and equipment. Waste disposal.	goggles. - Safety boots. - Overall. - Gloves. - Helmet.	
	9.9 Servicing Cassava Processing Machines	(a) Servicing grater	Discussion Guide students to describe concept of grater machine Demonstrate Guide students on how to Service grater Activity Organize students in manageable group to Service grater machine	Students should be able to: - Interpret drawings. - Select tools, equipment materials. - Inspect grater. - Service grater. - Conduct adjustments on machines. - Observe safety precautions. - Test cassava processing machines. - Clean	Serviced grater machines conform to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Service cassava graters. - Conduct adjustments of cassava graters - Operate the cassava graters Principles: Students should explain the principle of: - Operating the cassava processing machines. - Servicing the grater - Adjustments of cassava grater machines. Theories: Students should explain: - Procedures for servicing chipper Circumstantial	The following tools, equipment and safety gears are to be available: - Cassava grating machine. - Tool kit. - Hack saw. - Service manual. - Grease gun. - Power supply. - Oil can. - Multimeter. - Welding machine. - Trolley stand. - Work bench. - Bench grinding machine. - Safety goggles.	18

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
				tools, equipment and work place. • Store tools and equipment.		knowledge: Detailed knowledge about: Safety precautions while servicing cassava processing machines. • Safe handling of working tools and equipment. • Waste disposal.	• Safety boots. • Overall. • Gloves. • Helmet.	
		(b) Servicing chipper	Discussion Guide students to define, identify function of chipper machine Demonstrate Guide students on how to Service chipper Activity Organize students in manageable group to Service chipper machine	Students should be able to: • Interpret drawings. • Select tools, equipment materials. • Inspect cassava processing machines. • Service chipper machines. • Conduct adjustments on chipper machines. • Observe	Serviced chipper machines conform to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Service cassava graters and chippers. • Conduct adjustments of cassava clippers. • Operate the cassava clippers. Principles: Students should explain the principle of: • Operating the cassava chipper • Servicing the cassava chipper machines. • Adjustments of cassava processing	The following tools, equipment and safety gears are to be available: • Cassava chipping machine. • Tool kit. • Hack saw. • Service manual. • Grease gun. • Power supply. • Oil can. • Multimeter. • Welding machine. • Trolley stand. • Work bench.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
				safety precautions. • Test cassava processing machines. • Clean tools, equipment and work place. • Store tools and equipment.		machines. Theories: Students should explain: • Procedures for servicing cassava chipper machines. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while servicing cassava processing machines • Safe handling of working tools and equipment. • Waste disposal.	• Bench grinding machine. • Safety goggles. • Safety boots. • Overall. • Gloves. • Helmet.	
		(c) Dismantling grater and chipper	Discussion Guide students to define, Identify procedures for dismantling grater and chipper Demonstration Guide students on how to dismantle grater and chipper	Students should be able to: • Interpret drawings. • Select tools, equipment materials. • Dismantle grater and chipper machines • Clean	Dismantled grater and chipper machines conform to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: Dismantle grater and chipper Principles: Students should explain the principle of: • Dismantling grater and chipper machines. Theories: Students should explain:	The following tools, equipment and safety gears are to be available: • Cassava grating machine. • Cassava chipping machine. • Tool kit. • Hack saw. • Service	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			Activity Organize students in manageable group to dismantle grater and chipper	tools, equipment and work place. Store tools and equipment.		Procedures for Dismantling grater and chipper Circumstantial knowledge: Detailed knowledge about: - Safety precautions while dismantling grater and chipper - Safe handling of working tools and equipment. - Waste disposal.	manual. - Grease gun. - Power supply. - Oil can. - Multimeter. - Welding machine. - Trolley stand. - Work bench. - Bench grinding machine. - Safety goggles. - Safety boots. - Overall. - Gloves. - Helmet.	
		(d) Assembling grater and chipper	Discussion Guide students to define, Identify procedures for assembling grater and chipper Practical work Guide students on how to	Students should be able to: - Interpret drawings. - Select tools, equipment materials. - Inspect cassava processing	Assembled grater and chipper conform to technical specifications .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Service cassava graters and chippers. - Conduct adjustments of cassava graters and clippers. - Operate the cassava	The following tools, equipment and safety gears are to be available: - Cassava grating machine. - Cassava chipping machine. - Tool kit.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			Service chipper Activity Organize students in manageable group to assemble grater and chipper machine	machines. - Assemble cassava processing machines. - Conduct adjustments on machines. - Observe safety precautions. - Test cassava processing machines. - Clean tools, equipment and work place. - Store tools and equipment		graters and clippers. Principles: Students should explain the principle of: - Assembling grater and chipper. Theories: Students should explain: - Procedures for Assembling grater and chipper. Circumstantial knowledge: Detailed knowledge about: Safety precautions while assembling grater and chipper machine - Safe handling of working tools and equipment. - Waste disposal.	- Hack saw. - Service manual. - Grease gun. - Power supply. - Oil can. - Multimeter. - Welding machine. - Trolley stand. - Work bench. - Bench grinding machine. - Safety goggles. - Safety boots. - Overall. - Gloves. - Helmet.	
	9.10 Servicing oil expellers	(a) Servicing drive mechanism	Brainstorm: Guide students to define, identify function of oil expeller	Students should be able to: - Interpret drawings. - Select	Serviced drive mechanism conform to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: Service drive mechanism	The following tools, equipment and safety gears are to be available: Screw type	18

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			Practical work: Guide students on how to Service drive mechanism Activity Organize students in manageable group to Service drive mechanism	tools and materials. - Inspect the seed oil extraction machines. - Service drive mechanism - Perform final adjustments. - Observe safety precautions. - Clean tools, equipment and work place. - Store tools and equipment.	.	Principles: Students should explain the principles of: - Servicing drive mechanism Theories: Students should explain: - Types of seed oil extraction machines. - Functions of different seed oil extraction machines components. - Procedures for servicing seed oil extraction machines. Circumstantial knowledge: Detailed knowledge about: - Safety precaution while servicing oil expellers. - Safe handling of working tools and equipment. - Waste disposal.	seed oil extraction machine. - Ram press seed oil extraction machine. - Tool kit. - Lifting machine. - Oil boiling tank. - Gravity oil filtration equipment. - Pressurized oil filtration machine. - Trolley. - Service manual. - Grease gun. - Oil can. - Welding machine. - Air compressor.	
		(b) Servicing oil filters	Brainstorm Guide students to define,	Students should be able to:	Serviced oil filters conform to	Knowledge evidence: Detailed knowledge of: Method used: Students	The following tools, equipment and safety gears	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			Identify function of oil filters Demonstration Guide students on how to Service oil filters Activity Organize students in manageable group to Service oil filters	• Interpret drawings. • Select tools and materials. • Inspect oil filters • Service oil filters. • Observe safety precautions. • Clean tools, equipment and work place. • Store tools and equipment.	technical specifications	should explain how to: • Service oil filters Principles: Students should explain the principles of: • Servicing oil filters Theories: Students should explain: • Importance of servicing oil filter • Procedures for servicing oil filters Circumstantial knowledge: Detailed knowledge about: • Safety precaution while servicing oil filter. • Safe handling of working tools and equipment. • Waste disposal.	are to be available: • Screw type seed oil extraction machine. • Ram press seed oil extraction machine. • Tool kit. • Lifting machine. • Oil boiling tank. • Gravity oil filtration equipment. • Pressurized oil filtration machine. • Trolley. • Service manual. • Grease gun. • Oil can. • Welding machine. • Air compressor.	
		(c) Servicing	Brainstorm	Students	Serviced	Knowledge evidence:	The following	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
		boiler and tanks	Guide students to define, Identify function of boiler Practical work Guide students on how to Service boiler and tanks Activity Organize students in manageable group to Service boiler and tanks.	should be able to: • Interpret drawings. • Select tools and materials. • Inspect the seed oil extraction machines. • Service boilers. • Observe safety precautions. • Clean tools, equipment and work place. • Store tools and equipment.	boiler and tanks. Conform to technical specifications .	Detailed knowledge of: Method used: Students should explain how to: • Service boiler. Principles: Students should explain the principles of: • Boiler operation and services. • Maintenance of boiler Theories: Students should explain: • Procedures for servicing Boiler Circumstantial knowledge: Detailed knowledge about: • Safety precaution while servicing Boiler • Safe handling of working tools and equipment. • Waste disposal.	tools, equipment and safety gears are to be available: • Screw type seed oil extraction machine. • Tool kit. • Lifting machine. • Oil boiling tank. • Gravity oil • Trolley. • Service manual. • Grease gun. • Oil can. • Air compressor.	
		(d) Servicing oil expellers	Brainstorm Guide students to define, Identify tools used to service	Students should be able to: • Interpret drawings.	Serviced oil expellers machines conform to technical	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Service oil expeller	The following tools, equipment and safety gears are to be available:	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			oil expellers . Practical work Guide students on how to Service oil expellers Activity Organize students in manageable group to Service oil expellers.	- Select tools and materials. - Inspect the oil expellers. - Service oil expellers. - Assemble seed oil expeller components. - Perform final adjustments. - Observe safety precautions. - Test seed oil expellers - Clean tools, equipment and work place. - Store tools and equipment	specifications .	Principles: Students should explain the principles of: - Servicing oil expeller machines. - Adjustments of seed oil extraction machines. Theories: Students should explain: - Procedures for servicing oil expellers Circumstantial knowledge: Detailed knowledge about: - Safety precaution while servicing oil expellers. - Safe handling of working tools and equipment. - Waste disposal.	- Screw type seed oil extraction machine. - Ram press seed oil extraction machine. - Tool kit. - Lifting machine. - Oil boiling tank. - Trolley. - Service manual. - Grease gun. - Oil can. - Welding machine. - Air compressor.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
	9.11 Performing palletizer machine	(a) Servicing palletizer machine	Brainstorm Guide students to define, identify function of palletizer machine Practical work Guide students on how to Service palletizer machine Activity Organize students in manageable group to Service palletizer machine	Students should be able to: • Interpret drawings. • Select tools and materials. • Perform final adjustments. • Observe safety precautions. • Clean tools, equipment and work place. • Store tools and equipment.	Serviced palletizer machine as per technical specifications	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Dismantle palletizer machines. • Service palletizer machines. • Adjust palletizer machines. • Assemble palletizer machines. Principles: Students should explain the principles of: • Servicing palletizer machines. Theories: Students should explain: • Types of palletizer machines. • Functions of different palletizer machines components. • Procedures for operating palletizer machines. • palletizer machine maintenance and service Circumstantial	The following tools, equipment and safety gears are to be available: • Tool kit. • Wood • Plastic. • Service manual. • Grease gun. • Oil can. • Palletize machine. • Air compressor.	8

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
						knowledge: Detailed knowledge about: • Safety precaution while performing palletizer machine. • Safe handling of working tools and equipment. • Waste disposal.		
		(b) Performing palletizer machine	Brainstorm Guide students to define, Identify procedures for operating palletizer machine. Practical work Guide students on how to operate palletizer machine Activity Organize students in manageable group to operate	Students should be able to: • Interpret drawings. • Select tools and materials. • Operate palletizer machine • Observe safety precautions. • Clean tools, equipment and work place. • Store tools and equipment.	palletizer machine performed as per technical specifications	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Perform palletizer machines. Principles: Students should explain the principles of: • Operating palletizer machines. Theories: Students should explain: • Procedures for operating palletizer machines. Circumstantial knowledge: Detailed knowledge about: • Safety precaution while performing	The following tools, equipment and safety gears are to be available: • Tool kit. • Wood • Plastic. • Service manual. • Grease gun. • Oil can. • Palletize machine. • Air compressor.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
			palletizer machine			palletizer machine. • Safe handling of working to tools and equipment. • Waste disposal.		
	9.12 Performing husky machine operation	(a) Servicing of husky machine	Brainstorm Guide students to define, Identify function of husky machine Practical work Guide students on how to Service husky machine Activity Organize students in manageable group to service husky machine	Students should be able to: • Interpret drawings. • Select tools and materials. • Dismantle husky machine. • Assemble husky machines • Service husky machine. • Observe safety precautions • Adjust Husky machines. • Test machines. • Clean	Serviced husky machines conform to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Service of husky machine Principles: Students should explain the principles of: • Servicing husky machine Theories: Students should explain: • Types of husky machines. • Functions of different husky machines components. • Procedures for servicing husky machines. • husky machine maintenance and service Circumstantial knowledge: Detailed knowledge about:	The following tools, equipment and safety gears are to be available: • Tool kit. • Service manual. • Grease gun. • Oil can. • Husky machine. • Oil can. • Air compressor.	18

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
				tools, equipment and work place. • Store tools and equipment		• Safety precaution while performing husky machine operation. • Safe handling of working to tools and equipment. • Waste disposal		
		(a) Performing labelling	Discussion Guide students to define, identify importance of performing labelling Practical work Guide students on how to Perform labelling Activity Organize students in manageable group to Perform labelling	Students should be able to: • Interpret drawings. • Select tools and materials. • Perform labelling • Observe safety precautions. • Clean tools, equipment and work place. • Store tools and equipment.	labelling conform to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: Perform labelling Principles: Students should explain the principles of: •Performing labelling Theories: Students should explain: •Procedures for performing labelling Circumstantial knowledge: Detailed knowledge about: • Safety precaution while performing husky machine operation. • Safe handling of working to tools	The following tools, equipment and safety gears are to be available: • Tool kit. • Service manual. • Grease gun. • Oil can. • Husky machine. • Oil can. • Air compressor.	

	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Service Assessment	Knowledge assessment		
						and equipment. • Waste disposal		
		(b) Performing packaging	Discussion Guide students to describe concept of packaging Demonstration Demonstrate to students on how to perform packaging Activity Organize students in manageable group to perform packaging	Students should be able to: • Interpret drawings. • Select tools and materials. • Perform packaging • Observe safety precautions. • Clean tools, equipment and work place. • Store tools and equipment.	Perform packaging conform to technical specifications	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Perform packaging • Importance of packaging Principles: Students should explain the principles of: • Performing packaging Theories: Students should explain: • importance of packaging Circumstantial knowledge: Detailed knowledge about: • Safety precaution while performing husky machine operation. • Safe handling of working tools and equipment. • Waste disposal	The following tools, equipment and safety gears are to be available: • Tool kit. • Service manual. • Grease gun. • Oil can. • Husky machine. • Oil can. • Air compressor.	
10.Project	Project							150

Form Four

Table 6: Detailed Contents for Form Four

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
1.0. Maintaining planting machinery	1.1. Performing tractor drawn planting machines	(a) Servicing wheel driven planting machines	Discussion Guide students to describe wheel driven planting machines Demonstrate Guide students on how to handle tools, equipment and machines safely Activity Organize students in manageable group to service wheel driven planting machines	Students should be able to: • Select tools and equipment. • Inspect the wheel driven planting machines. • Dismantle the wheel driven planting machines • Identify defects. • Service wheel driven planting machines • Assemble wheel driven planting machines units. • Perform relevant adjustments.	Tractor drawn wheel driven planting machines serviced as per technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Calibrate wheel driven planting machines Principles: Students should explain the principle of: • Attaining seed spacing on wheel driven planting machines • Attaining required quantity of fertilizer per plant on wheel driven planting machines. • Attaining seed depth control on wheel driven planting machines. • Servicing wheel driven planting machines Theories: Students should: • Describe a tractor drawn wheel driven planting machines • Outline different types of wheel driven planting machines. • Explain procedures of	The following tools, equipment and safety gears are to be available: • Tractor drawn planter. • Tractor drawn seed drill. • Tool kit. • Oil can. • Grease gun. • Service manual. • Welding machine. • Stoppers. • Wheel spanner • Jack. • Work bench. • Vice. • Power supply. • Lifting and lowering equipment. • Hand grinder. • Safety boots. • Safety goggles. • Gloves.	53

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				- Observe safety precautions. - Test wheel driven planting machines. - Clean tools, equipment and work place. - Store tools and equipment.		servicing tractor wheel driven planting machines. - Know advantages of using wheel driven planting machines in farming. - Briefly explain the drive mechanisms of wheel driven planting machines. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while performing service of tractor wheel driven planting machines. - Safe handling of working tools and equipment. - Waste disposal.	- Helmet. - Overall.	
		(b) Service pneumatic planting machines	Discussion Guide students to describe concept of pneumatic planting machines	Students should be able to: - Select tools and equipment. - Inspect the pneumatic planting	Tractor drawn pneumatic planting machines serviced as per technical specification	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Attain seed spacing on pneumatic planting machines. - Attain required quantity	The following tools, equipment and safety gears are to be available: - Tractor drawn planter. - Tractor drawn seed drill.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Demonstration Demonstrate to students on how to service pneumatic planting machines Activity Organize students in manageable group to Service pneumatic planting machines	machines. - Dismantle the pneumatic planting machines. - Identify defects. - Service pneumatic planting machines - Assemble pneumatic planting machines units. - Perform relevant adjustments on pneumatic planting machines. - Observe safety precautions - Test pneumatic planting machines. - Clean tools,	s.	of fertilizer on pneumatic planting machines. - Attain depth of seed placement on pneumatic planting machines. - Service tractor driven pneumatic planting machines. - Dismantle and assemble pneumatic planting machines. Principles: Students should explain the principle of: - Attaining seed spacing on pneumatic planting machines. - Attaining required quantity of fertilizer per plant on pneumatic planting machines. - Attaining seed depth control on pneumatic planting machines. - Servicing pneumatic planting machines. Theories: Students should: - Describe a tractor drawn pneumatic planting machines. - Outline different types of pneumatic planting	- Tool kit. - Oil can. - Grease gun. - Service manual. - Welding machine. - Stoppers. - Wheel spanner - Jack. - Work bench. - Vice. - Power supply. - Lifting and lowering equipment. - Hand grinder. - Safety boots. - Safety goggles. - Gloves. - Helmet. - Overall.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				equipment and work place. • Store tools and equipment.		machines • Explain procedures of servicing tractor pneumatic planting machines. • Know advantages of using pneumatic planting machines in farming. • Briefly explain the drive mechanisms of pneumatic planting machines. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while performing service of tractor drawn planting machine. • Safe handling of working tools and equipment. • Waste disposal.		
	1.2. Performing transplanter equipment	(a) Servicing walking transplanter	Brainstorm Guide students to define walking transplanter Demonstration	Students should be able to: • Select tools and equipment. • Inspect the walking	Walking transplanter serviced as per technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Attain seedlings spacing on walking transplanter. • Attain row spacing on	The following tools, equipment and safety gears are to be available: • Walking type transplanter. • Riding type	53

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
	pment's		Demonstrate to on how to service walking transplanters Practical work Guide students on how to service walking transplanters	- transplanters - Dismantle the walking transplanters - Identify defects on walking transplanters - Assemble walking transplanters units. - Perform relevant adjustments. - Test walking transplanters - Observe safety precautions - Clean tools, equipment and work place. - Store tools and equipment.		- seedling on walking transplanters. - Attain number of seedlings per hill on walking transplanters. - Attain depth of seedlings placement on walking transplanters. - Dismantle walking transplanters. - Service walking transplanters. - Assemble walking transplanters. Principles: Students should explain the principle of: - Seedling inter row spacing on walking transplanters. - Inter row spacing of seedling on walking transplanters. - Number of seedling per hill by using walking transplanters. - Depth of seedling in the soul. - Dismantling the walking transplanters - Servicing walking transplanters.	- transplanter. - Tractor driven seed drill. - Tool kit. - Oil can. - Grease gun. - Service manual. - Welding machine. - Stoppers. - Wheel spanner. - Jack. - Work bench. - Vice. - Power supply. - Lifting and lowering equipment. - Hand grinder. - Safety goggles. - Gloves. - Overall. - Helmet. - Safety boots.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						- Assembling walking transplanters. Theories: Students should: - Describe walking transplanters - Explain different types of walking transplanters. - Outline procedures of servicing walking transplanters. - Explain procedures to dismantle walking transplanters. - Outline the procedures to assemble walking transplanters. - Describe walking transplanters mechanism. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while performing service of walking transplanters. - Safe handling of working tools and equipment.		
		(b) Servicing riding transplanter	Brainstorm Guide students to define riding	Students should be able to: Select tools	Riding transplanters as per	Knowledge evidence: Detailed knowledge of: Method used: Students	The following tools, equipment and safety gears are to	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
		rs	transplanters Demonstration Demonstrate to on how to service riding transplanters Practical work Guide students on how to service riding transplanters	and equipment. - Inspect the riding transplanters - Dismantle the riding transplanters - Identify defects. - Assemble riding transplanter units. - Perform relevant adjustments on riding transplanters - Test transplanter. - Observe safety precautions - Clean tools, equipment and work place. - Store tools and equipment.	technical specifications.	should explain how to: - Attain seedlings spacing on riding transplanters. - Attain row spacing on seedling on riding transplanters. - Attain number of seedlings per hill on riding transplanters. - Attain depth of seedlings placement on riding transplanters. - Dismantle riding transplanters. - Service riding transplanters. - Assemble riding transplanters Principles: Students should explain the principle of: - Seedling inter row spacing on riding transplanters. - Inter row spacing of seedling on riding transplanters. - Number of seedling per hill by using riding transplanters. - Depth of seedling in the soul on riding transplanters.	be available: - Walking type transplanter. - Riding type transplanter. - Tractor driven seed drill. - Tool kit. - Oil can. - Grease gun. - Service manual. - Welding machine. - Stoppers. - Wheel spanner. - Jack. - Work bench. - Vice. - Power supply. - Lifting and lowering equipment. - Hand grinder. - Safety goggles. - Gloves. - Overall. - Helmet. - Safety boots.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						• Dismantling the riding transplanters. • Servicing riding transplanters. • Assembling riding transplanters. Theories: Students should: • Describe riding transplanters. • Explain different types of riding transplanters. • Outline procedures of servicing riding transplanters. • Explain procedures to dismantle riding transplanters. • Outline the procedures to assemble riding transplanters. • Describe transplanting mechanism of riding transplanters Circumstantial knowledge: Detailed knowledge about: • Safety precautions while performing service of riding transplanters. • Safe handling of working tools and		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						equipment. • Waste disposal.		
2.0. Maintaining fertilizer machinery	2.1. Performing fertilizer applicators and distributors equipments	(a) Servicing pneumatic fertilizer applicators	Brainstorm Guide students to define pneumatic fertilizer applicators Demonstration Demonstrate to on how to service pneumatic fertilizer applicators Practical work Guide students on how to service pneumatic fertilizer applicators	Students should be able to: • Interpret drawings. • Select tools, equipment and materials. • Inspect pneumatic fertilizer applicators. • Dismantle pneumatic fertilizer applicators. • Service pneumatic fertilizer applicators components. • Assemble pneumatic fertilizer applicators • Conduct adjustment on pneumatic fertilizer	Serviced pneumatic fertilizer applicators conforms to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Service pneumatic fertilizer applicators. • Conduct adjustment of pneumatic fertilizer applicators. • Operate the pneumatic fertilizer applicators Principles: Students should explain the principle of: • Operating the pneumatic fertilizer applicators. • Dismantling pneumatic fertilizer applicators • Servicing pneumatic fertilizer applicators • Assembling pneumatic fertilizer applicators • Adjusting pneumatic fertilizer applicators Theories: Students should explain: • Types of pneumatic fertilizer applicators • Functions of different parts of pneumatic fertilizer applicators.	The following tools, equipment and safety gears are to be available: • Fertilizer distributors / applicators. • Tool kit. • Hack saw. • Service manual. • Grease gun. • Power supply. • Oil can. • Multimeter. • Welding machine. • Trolley stand. • Work bench. • Bench grinding machine. • Safety goggles. • Gloves. • Overall. • Safety boots. • Helmet.	60

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				• applicators • Test pneumatic fertilizer applicators • Observe safety precautions • Clean tools, equipment and work place. • Observe safety precautions • Store tools and equipment.		• Use of different power mechanism in running pneumatic fertilizer applicators. • Procedure for servicing pneumatic fertilizer applicators. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while performing the task. • Safe handling of working tools and equipment. Waste disposal.		
		(b) Service spinning disc fertilizer applicators	Brainstorm Guide students to define spinning disc fertilizer applicators Demonstration Demonstrate to on how to service spinning disc fertilizer	Students should be able to: • Interpret drawings. • Select tools, equipment and materials. • Inspect spinning disc fertilizer	Serviced spinning disc fertilizer applicators conforms to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Service spinning disc fertilizer applicators • Conduct adjustment of spinning disc fertilizer applicators. • Operate the spinning disc fertilizer applicators.	The following tools, equipment and safety gears are to be available: • Fertilizer distributors / applicators. • Tool kit. • Hack saw. • Service manual. • Grease gun. • Power supply.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			applicators Practical work Guide students on how to service spinning disc fertilizer applicators	- applicators. - Dismantle spinning disc fertilizer applicators. - Service spinning disc fertilizer applicators components. - Assemble spinning disc fertilizer applicators. - Conduct adjustment on spinning disc fertilizer applicators. - Test spinning disc fertilizer applicators - Observe safety precautions - Clean tools,		Principles: Students should explain the principle of: - Operating the spinning disc fertilizer applicators. - Dismantling spinning disc fertilizer applicators. - Servicing spinning disc fertilizer applicators - Assembling spinning disc fertilizer applicators - Adjusting spinning disc fertilizer applicators. Theories: Students should explain: - Types of spinning disc fertilizer applicators. - Functions of different parts of spinning disc fertilizer applicators. - Use of different power mechanism in running spinning disc fertilizer applicators. - Procedure for servicing spinning disc fertilizer applicators. Circumstantial knowledge: Detailed knowledge about:	- Oil can. - Multimeter. - Welding machine. - Trolley stand. - Work bench. - Bench grinding machine. - Safety goggles. - Gloves. - Overall. - Safety boots. - Helmet.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				equipment and work place. - Observe safety precautions. - Store tools and equipment.		- Safety precautions while performing the task. - Safe handling of working tools and equipment. - Waste disposal.		
	2.2. Performing manure spreader equipment	(a) Servicing rotary manure spreader	Brainstorm Guide students to define rotary manure spreader Demonstration Demonstrate to on how to service rotary manure spreader Practical work Guide students on how to service rotary manure spreader	Students should be able to: - Interpret technical drawings. - Select tools, equipment and materials. - Inspect rotary manure spreader - Dismantle rotary manure spreader - Service rotary manure spreader. - Assemble	Serviced rotary manure spreader conforms to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Service rotary manure spreader. - Conduct adjustment of rotary manure spreader - Operate rotary manure spreader. Principles: Students should explain the principle of: - Operating rotary manure spreader. Theories: Students should explain: - Types of rotary manure spreader. - Functions of different parts of rotary manure spreader. - Use of different source	The following tools, equipment and safety gears are to be available: - Manure spreaders. - Tool kit. - Hacksaw. - Service manual. - Grease gun. - Power supply. - Oil can. - Welding machine - Trolley stand. - Lifting machines. - Work bench. - Bench grinding machine. - Safety goggles. - Gloves.	60

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				rotary manure spreader. - Conduct adjustments on rotary manure spreader. - Test manure spreader. - Observe safety precautions - Clean tools, equipment and work place. - Store tools and equipment.		of power in running rotary manure spreader. - Procedure for servicing rotary manure spreader. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while performing service of rotary manure spreader. - Safe handling of working tools and equipment. - Waste disposal.	- Overall. - Safety boots. - Helmet.	
		(b) Servicing converter manure spreader	Brainstorm Guide students to define converter manure spreader Demonstration Demonstrate to on how to service	Students should be able to: - Interpret technical drawings. - Select tools, equipment and materials. - Inspect converter	Serviced converter manure spreader conforms to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Service converter manure spreader. - Conduct adjustment of converter manure spreader - Operate converter manure spreader.	The following tools, equipment and safety gears are to be available: - Manure spreaders. - Tool kit. - Hacksaw. - Service manual. - Grease gun. - Power supply.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			converter manure spreader Practical work Guide students on how to service converter manure spreader	manure spreader. • Dismantle converter manure spreader. • Service converter manure spreader. • Assemble converter manure spreader. • Conduct adjustments on converter manure spreader. • Test converter manure spreader • Observe safety precautions • Clean tools, equipment and work place. • Store tools and		Principles: Students should explain the principle of: • Operating converter manure spreader. Theories: Students should explain: • Types of converter manure spreader. • Functions of different parts of converter manure spreader. • Use of different source of power in running converter manure spreader. • Procedure for servicing converter manure spreader. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while performing service of converter manure spreader. • Safe handling of working tools and equipment. Waste disposal.	• Oil can. • Welding machine • Trolley stand. • Lifting machines. • Work bench. • Bench grinding machine. • Safety goggles. • Gloves. • Overall. • Safety boots. Helmet.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				equipment.				
3.0. Using organic fertilizers and herbicides	3.1. Performing organic fertilizer	(a) Performing mulching	Brainstorm Guide students to define mulching Demonstration Demonstrate to on how to perform mulching Practical work Guide students on how to perform mulching	Students should be able to: - Select tools, equipment and materials. - Describe procedure for mulching - Observe safety precautions - Clean tools, equipment and work place. - Store tools and equipment	Mulching performed conforms to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Performing mulching Principles: Students should explain the principle of: - Mulching in organic agriculture Theories: Students should explain: - Explain the process of mulching - Mention the types and materials used for mulching - Explain why mulching is important in agriculture, mention its primary benefits - Explain the role of organic mulch, mention examples of organic materials used - Explain the difference between organic and inorganic mulches, mention examples of each type - Describe the advantages	The following tools, equipment and safety gears are to be available: - Cattle Manure. - Domestic sewage - Green manure - Agricultural waster - Water - Basket - Tool kit. - Gloves. - Overall. - Safety boots	40

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						and disadvantages of organic and inorganic mulches. • Explain how mulching contributes to weed control, mention the methods by which • Explain the process of applying mulch to crops, mention the steps involved in proper mulching, and describe how to maintain the mulch layer for optimal effectiveness. • Explain the importance of mulching in sustainable farming practices to organic agriculture Circumstantial knowledge: Detailed knowledge about: • Safety precautions while performing organic management practice. • Safe handling of working tools and equipment. Waste disposal.		
		(b) Performin	Brainstorm	Students should	Water	Knowledge evidence:	The following tools,	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
		g water management	Guide students to define water management Demonstration Demonstrate to on how to Perform water management Practical work Guide students on how to Perform water management	be able to: • Select tools, equipment and materials. • Describe the procedure for performing water management • Observe safety precautions • Clean tools, equipment and work place. • Store tools and equipment	management performed conforms to technical specifications.	Detailed knowledge of: Method used: Students should explain how to: • Performing water management Principles: Students should explain the principle of: • Procedure for perform water management • water management in organic agriculture Theories: Students should explain: • Explain the importance of water management in agriculture • Mention the key principles of water management • Explain the role of soil moisture monitoring in water management • Explain the concept of rainwater harvesting • Mention materials used for collection rainwater harvesting • Explain the relationship between climate and water management in agriculture • Mention the factors that	equipment and safety gears are to be available: • Cattle Manure. • Domestic sewage • Green manure • Agricultural waster • Water • Basket • Tool kit. • Gloves. • Overall. • Safety boots. • Helmet.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						affect water requirements for crops - Explain the process of water recycling in agriculture, - Mention the methods used for recycling water in agriculture Circumstantial knowledge: Detailed knowledge about: - Safety precautions while performing water management practice. - Safe handling of working tools and equipment. - Waste disposal.		
		(c) Performing nutrient management	Brainstorm Guide students to define nutrient management Demonstration Demonstrate to them how to perform nutrient management	Students should be able to: - Select tools, equipment and materials. - Describe procedure for performing nutrient management - Observe safety	Nutrient management performed conforms to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Performing nutrient management Principles: Students should explain the principle of: - Procedure for preparing organic fertilizers - Nutrient management in organic agriculture Theories: Students should	The following tools, equipment and safety gears are to be available: - Cattle Manure. - Domestic sewage - Green manure - Agricultural waster - Water - Basket - Tool kit.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Practical work Guide students on how to Perform nutrient management	precautions • Clean tools, equipment and work place. • Store tools and equipment		explain: • Explain the importance of nutrient management in crop production, • Explain the role of organic fertilizers in nutrient management • Mention examples of organic fertilizers • Explain the difference between macro and micro-nutrients • Explain the process of nutrient deficiency in plants, mention common signs of nutrient deficiency, and describe how to correct them through fertilization. • Explain the concept of nutrient leaching, mention the factors that contribute to it, Circumstantial knowledge: Detailed knowledge about: • Safety precautions while performing nutrients management practice. • Safe handling of working tools and	• Gloves. • Overall. • Safety boots. Helmet.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						equipment. • Waste disposal.		
	3.2. Performing organic herbicides	(a) Performing pest and disease management	Brainstorm Guide students to define pest and disease management Demonstration Demonstrate to on how to Perform pest and disease management Practical work Guide students on how to Perform pest and disease management	Students should be able to: • Select tools, equipment and materials. • Describe pest management techniques • Describe disease management techniques • Observe safety precautions • Clean tools, equipment and work place. • Store tools and equipment	Pest and disease management performed conforms to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Organic insecticides management • Organic disease management Principles: Students should explain the principle of: • Procedure for prepare organic insecticides Theories: Students should explain: • Types of organic insecticides. • Describe step by step conversion to organic agriculture. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while performing organic herbicides • Safe handling of working tools and equipment. • Waste disposal.	The following tools, equipment and safety gears are to be available: • Tool kit. • Woodchips • Vinegar • Onion • Neem tree • pepper • Safety goggles. • Gloves. • Overall. • Safety boots. • Helmet.	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	Product/Services Assessment	Knowledge Assessment		
		(b) Performing weed management	Brainstorm Guide students to define weed management Demonstration Demonstrate to on how to Perform weed management Practical work Guide students on how to perform weed management	Students should be able to: • Select tools, equipment and materials. • Describe organic weed management techniques • Observe safety precautions • Clean tools, equipment and work place. • Store tools and equipment	Weed management performed conforms to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Prepare organic weedicides/herbicides • Procedure of using organic weedicides/herbicides Principles: Students should explain the principle of: • Procedure for prepare organic weedicides/herbicides Theories: Students should explain: • Types of organic weedicides/herbicides • Describe step-by-step of preparing weedicides/herbicides Circumstantial knowledge: Detailed knowledge about: • Safety precautions while performing organic herbicides • Safe handling of working tools and equipment. • Waste disposal.	The following tools, equipment and safety gears are to be available: • Tool kit. • Woodchips • Vinegar • Onion • Neem tree • pepper • Safety goggles. • Gloves. • Overall. • Safety boots. • Helmet.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
4.0. Managing safe work environment	4.1. Managing hazards	(a) Controlling mechanical hazards	Brainstorm Guide students to define Control mechanical hazards Demonstration Demonstrate to on how to Control mechanical hazards Practical work Guide students on how to Control mechanical hazards	Students should be able to: • Interpret service manuals • Select tools and equipment • Use OSHA rules and regulations • Prepare workshop inspection report • Prepare workshop color code and safety signs • Identify any safety hazard materials • Handle mechanical hazards material • Prepare preventive maintenance schedule	Mechanical hazards are controlled according to OSHA's rules and regulations.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Interpret OSHA rules and regulations • Use safety gears • 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 gears Principles: Students should explain the principles of: • Preparing inspection check lists • Preparing warning signs and safety instructions • Identifying mechanical hazards materials • Preparing and conducting training • Handling mechanical hazards materials	The following tools, equipment and safety gears are to be available: • Electrical equipment • Mechanical equipment • Power machines • Measuring tools • Cutting tools • First aid kit • Fire extinguishers • Service manuals • OSHA rules and regulations • Helmet • Gloves • Ear plug • Mask • Gloves	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	Product/Services Assessment	Knowledge Assessment		
				- Identify and apply all emergency equipments and supplies - Conduct safety awareness training to subordinates - Monitor safety environment - Manage uses of safety gears - Cleaning tools and equipment - Storing tools and equipment		Theories: Students should explain:- - Function of inspection check list - Importance of posting warning sign and safety instructions - Importance of carry out accident investigation - Importance of monitor safety at working place Circumstantial knowledge Detailed knowledge about: - Safety precautions while manage hazards - Safe handling of tools and equipment - Waste disposal		
		(b) Controlling chemical hazards	Brainstorm Guide students to define chemical hazards Demonstration Demonstrate to	Students should be able to: - Interpret service manuals - Select tools and equipment	Chemical hazards are controlled according to OSHA's rules and regulations.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Interpret OSHA rules and regulations - Use safety gears - Prepare preventive	The following tools, equipment and safety gears are to be available: - Electrical equipment - Mechanical equipment	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			on how to Control chemical hazards Practical work Guide students on how to Control chemical hazards	• Use OSHA rules and regulations • Prepare workshop inspection report • Prepare workshop color code and safety signs • Identify any safety chemical hazard materials • Handle chemical hazards material • Prepare a preventive maintenance schedule • Identify and apply all emergency equipment and supplies • Conduct safety		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 gears Principles: Students should explain the principles of: • Preparing inspection check lists • Preparing warning signs and safety instructions • Identifying chemical hazards materials • Preparing and conducting training • Handling chemical hazards materials Theories: Students should explain: - • Function of inspection check list • Importance of posting warning sign and safety instructions • Importance of carry out	• 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	Product/Services Assessment	Knowledge Assessment		
				awareness training to subordinates • Monitor safety environment • Manage uses of safety gears • Cleaning tools and equipment • Storing tools and equipment		accident investigation • Importance of monitor safety at working place Circumstantial knowledge Detailed knowledge about: • Safety precautions while managing chemical hazards • Safe handling of tools and equipment • Waste disposal		
		(c) Controlling Physical hazards	Brainstorm Guide students to define physical hazards Demonstration Demonstrate to on how to Control Physical hazards Practical work Guide students	Students should be able to: • Interpret service manuals • Select tools and equipment • Use OSHA rules and regulations • Prepare workshop inspection report	Physical hazards are controlled according to OSHA's rules and regulations.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Interpret OSHA rules and regulations • Use safety gears • Prepare preventive maintenance schedule and inspection report • Prepare warning signs and safety instructions • Conduct assessment • Carry out accident investigation	The following tools, equipment and safety gears are to be available: • Electrical equipment • Mechanical equipment • Power machines • Measuring tools • Cutting tools • First aid kit • Fire extinguishers	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			on how to Control Physical hazards	• Prepare workshop color code and safety signs • Identify any safety Physical hazards materials • Handle Physical hazards material • Prepare preventive maintenance schedule • Identify and apply all emergency equipment and supplies • Conduct safety awareness training to sub-ordinates • Monitor safety environment		• Monitor safe working environment • Manage uses of safety gears Principles: Students should explain the principles of: • Preparing inspection check lists • Preparing warning signs and safety instructions • Identifying physical hazards materials • Preparing and conducting training • Handling physical hazards materials Theories: Students should explain:- • Function of inspection check list • Importance of posting warning sign and safety instructions • Importance of carry out accident investigation • Importance of monitor safety at working place Circumstantial knowledge Detailed knowledge about: • Safety precautions while manage hazards	• 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	Product/Services Assessment	Knowledge Assessment		
				• Manage uses of safety gears • Cleaning tools and equipment • Storing tools and equipment		• Safe handling of tools and equipment • Waste disposal		
	4.2. Carrying out risk assessment	(a) Controlling risk	Brainstorm Guide students to define risk Demonstration Demonstrate to on how to Control risk Practical work Guide students on how to Control risk	Students should be able to: • 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	Risk assessment carried out as per OSHA standard and automobile regulations.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Conduct safety training • Identify safety hazard material • Handle hazard material • Prepare inspection report Principles: Students should explain the principles of: • Reacting correctly and safely when faced with an emergency • Identifying and applying correctly all emergency equipment and supplies • Conducting safety training • Identifying safely hazard materials	The following tools, equipment and safety gears are to be available: • Service manuals • OSHA regulations • Workshop rules • Camera • Risk assessment sheet • Mask • Ear plug • Gloves • Overall • Safety boots • Safety clear glasses	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	Product/Services Assessment	Knowledge Assessment		
				- Identify and apply correctly all emergency equipment and supplies - Make periodic inspections of workshop area and all equipment and prepare report - Conduct safety training - Prepare universal workshop color codes and know what the color represents - Make out and file safe report - Monitor good environmental practices		- Handling hazard materials Theories: Students should explain:- - Carryout risk assessment - Conducting safety training - Inspecting workshop areas tools and equipment - Handling Hazard material correctly - Follow compressed air rules Circumstantial knowledge Detailed knowledge about: - Safety precautions while carrying out risk management - Safe handling of tools and equipment - Waste disposal		

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				- Clean tools and equipment - Store tools and equipment				
		(b) Managing safety gears	Brainstorm Guide students to define safety gear terms Demonstration Demonstrate to on how to Manage safety gears Practical work Guide students on how to Manage safety gears	Students should be able to: - Interpret service manuals - Select tools and equipment - Manage safety gears during working activities. - Ensure availability of personal protective equipment - Clean tools and equipment - Store tools and equipment	Safety gear managed per OSHA standard and automobile regulations.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Manage safety gears Principles: Students should explain the principles of: - Selection of Appropriate Safety Gears - Proper Usage of Safety Gears - Training on Safety Gear Usage - Storage and Handling of Safety Gear - Promoting a Safety Culture Theories: Students should explain: - - Explain the importance of safety gear in the workplace - Explain the role of personal protective equipment (PPE) in	The following tools, equipment and safety gears are to be available: - Service manuals - OSHA regulations - Workshop rules - Camera - Risk assessment sheet - Mask - Ear plug - Gloves - Overall - Safety boots - Safety clear glasses	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						ensuring workplace safety, mention common types of PPE • Explain the procedure for selecting appropriate safety gear for a task • Describe factors that influence the selection of safety gear for a task • Explain the potential consequences of using damaged or improperly maintained safety gear • Explain how to properly store safety gear Circumstantial knowledge Detailed knowledge about: • Safety precautions while carrying out risk management • Safe handling of tools and equipment • Waste disposal		
	4.3. Managing environment	(a) Managing air pollution	Brainstorm Guide students to define air pollution Demonstration Demonstrate to on how to Manage air	Students should be able to: • Select relevant safety gears • Prepare preventive maintenance schedule	Air pollution managed as per rules and regulations.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Interpret OSHA rules and regulations • Prepare preventive maintenance schedule and inspection report	The following tools, equipment and safety gears are to be available: • Tool kit • Spirit level • Multimeter • Safety 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	Product/Services Assessment	Knowledge Assessment		
			pollution Practical work Guide students on how to Manage air pollution	- Control air pollution. - Maintaining safety environment - Managing safety personal environment - Control tools, equipment and safety gears - Control different types of air pollution as per OSHA - Conduct safety awareness training to subordinates - Clean tools and equipment - Store tools and equipment		- Monitor safe working environment - Control air pollution. - Control different types of air pollution. Principles: Students should explain the principles of: - Managing air pollution. - Handling environmental safety work - Preparing and conducting training - Handling different types of air pollution. Theories: Students should explain:- - Student should explain importance of safe work environment - Explain types of air pollution. - Importance of preparing environmental schedule - Importance of control different types of air pollution. Circumstantial knowledge Detailed knowledge about: - Safety knowledge while managing air pollution - Safe handling of tools	- Gloves - Overalls - Cleaning materials - Hoe - Broom - Brush - Safety gears - Dust covers - Dust mask - Dust bin - Wheel barrow	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						and equipment • Waste disposal		
		(b) Managing water pollution	Brainstorm Guide students to define water pollution Demonstration Demonstrate to on how to Manage water pollution Practical work Guide students on how to Manage water pollution	Students should be able to: • Select relevant safety gears • Prepare preventive maintenance schedule • Control water pollution • Maintaining safety environment • Managing safety personal environment • Control tools, equipment and safety gears • Control different types of water pollution as per OSHA	Water pollution managed as per rules and regulations.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Interpret OSHA rules and regulations • Prepare preventive maintenance schedule and inspection report • Monitor safe working environment • Control water pollution • Control different types of water pollution • Manage uses of safety gears Principles: Students should explain the principles of: • Managing water pollution • Handling environmental safety work • Preparing and conducting training • Handling different types of water pollution Theories: Students should explain:- • Student should explain	The following tools, equipment and safety gears are to be available: • Tool kit • Spirit level • Multimeter • Safety boots • Gloves • Overalls • Cleaning materials • Hoe • Broom • Brush • Safety gears • Dust covers • Dust mask • Dust bin • Wheel barrow	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				- Conduct safety awareness training to subordinates - Clean tools and equipment - Store tools and equipment		importance of safe work environment - Explain types of water pollution - Importance of preparing environmental schedule - Importance of control different types of water pollution Circumstantial knowledge Detailed knowledge about: - Safety knowledge while managing water pollution - Safe handling of tools and equipment - Waste disposal		
		(c) Managing land pollution	Brainstorm Guide students to define land pollution Demonstration Demonstrate to on how to Manage land pollution Practical work Guide students on how to Manage land	Students should be able to: - Select relevant safety gears - Prepare preventive maintenance schedule - Control land pollution - Maintaining safety environment - Managing	Land pollution managed as per rules and regulations.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Interpret OSHA rules and regulations - Prepare preventive maintenance schedule and inspection report - Monitor safe working environment - Control land pollution - Control different types of land pollution	The following tools, equipment and safety gears are to be available: - Tool kit - Spirit level - Multimeter - Safety boots - Gloves - Overalls - Cleaning materials - Hoe - Broom	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			pollution	safety personal environment • Control tools, equipment and safety gears • Control different types of land pollution as per OSHA • Conduct safety awareness training to subordinates • Clean tools and equipment • Store tools and equipment		• Manage uses of safety gears Principles: Students should explain the principles of: • Managing land pollution • Handling environmental safety work • Preparing and conducting training • Handling different types of land pollution Theories: Students should explain:- • Student should explain importance of safe work environment • Explain types of land pollution • Importance of preparing environmental schedule • Importance of control different types of land pollution Circumstantial knowledge Detailed knowledge about: • Safety knowledge while managing land pollution • Safe handling of tools and equipment • Waste disposal	• Brush • Safety gears • Dust covers • Dust mask • Dust bin • Wheel barrow	
5.0. Managi	5.1. Planni	(a) Preparing	Brainstorm	Students should	Preventive	Knowledge evidence:	The following tools,	45

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
ng preventive maintenance	ng preventive maintenance	schedules of preventive maintenance of tools, machines and equipment	Guide students to define terms Demonstration Demonstrate to on how to Prepare schedules of preventive maintenance of tools, machines and equipment Practical work Guide students on how to Prepare schedules of preventive maintenance of tools, machines and equipment	be able to: • Interpret service manuals • Read and apply workshop rules and regulations • Select tools and equipment • Prepare preventive maintenance programmes • Prepare workshop preventive maintenance schedule • Prepare and use workshop color court and safety signs • Plan and Prepare workshop inventory • Clean tools	maintenance is planned as per workshop standards.	Detailed knowledge of: Method used: Students should explain how to: • Prepare workshop inspection report • Plan and prepare preventive maintenance training Principles: Students should explain the principles of: • Preparing preventive maintenance schedule • Plan and prepare workshop inventory Theories: Students should explain:- • Importance of interpret service manuals • Importance of preparing maintenance training programmes • Importance of Cleaning and storing tools and equipment Circumstantial knowledge Detailed knowledge about: • Safety precautions while planning preventive maintenance • Safe handling of tools and equipment • Waste disposal	equipment and safety gears are to be available: • General hand foot kit • Workshop tools, equipment and machines • Service manuals • Workshop rules and regulations • Gloves • Overall • Safety boots • Safety clear glasses • Helmet • Mask • Ear plug	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				and equipment • Store tools and equipment				
		(b) Preparing inspection check list of tools, equipment and machine	Brainstorm Guide students to define terms Demonstration Demonstrate to on how to Prepare inspection check list of tools, equipment and machine Practical work Guide students on how to Prepare inspection check list of tools, equipment and machine	Students should be able to: • Interpret service manuals • Read and apply workshop rules and regulations • Select tools and equipment • Prepare workshop inspection report of tools and equipment • Plan and Prepare workshop inventory • Clean tools and equipment	Inspection check list of tools is prepared as per workshop standards.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Prepare workshop colour code and safety signed • Plan and prepare workshop inventory Principles: Students should explain the principles of: • Preparing colour code and safety signs • Plan and prepare workshop inventory Theories: Students should explain: - • Importance of preparing workshop inspection reports • Procedure for prepare inspection check list of tools, equipment and machine Circumstantial knowledge Detailed knowledge about: • Safety precautions while	The following tools, equipment and safety gears are to be available: • General hand foot kit • Workshop tools, equipment and machines • Service manuals • Workshop rules and regulations • Gloves • Overall • Safety boots • Safety clear glasses • Helmet • Mask • Ear plug	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				Store tools and equipment		prepare inspection check list of tools - Safe handling of tools and equipment - Waste disposal		
	5.2. Supervising preventive maintenance	(a) Performing preventive maintenance of tools, equipment and machines	Brainstorm Guide students to define terms Demonstration Demonstrate to on how to Perform preventive maintenance of tools, equipment and machines Practical work Guide students on how to perform preventive maintenance of tools, equipment and machines	Students should be able to: - Interpret service manuals - Read and apply rules and regulations - Prepare and apply workshop inspection report - Prepare and use safety signs and color code - Prepare and apply workshop preventive maintenance schedule - Plan and conduct	Preventive maintenance of tools, equipment, machines and building are performed as per workshop standards.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Prepare and apply workshop preventive schedule - Plan and conduct preventive maintenance training - Prepare safety signs and color code - Correct hand tools and equipment safety - Practice correct lift and jack safety - Good electrical safety Principles: Students should explain the principles of: - Preparing and applying preventive maintenance schedule - Preparing and use safety signs and color code - Plan and conduct preventive maintenance	The following tools, equipment and safety gears are to be available: - General hand foot kit - Workshop tools, equipment and machines - Service manuals - Workshop rules and regulations - Gloves - Overall - Safety boots - Safety clear glasses - Helmet - Mask - Ear plug	45

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				preventive maintenance training - Practice correct hand tools and equipment safety - Practice correct lift and jack safety - Practice good electrical safety - Clean tools and equipment - Store tools and equipment		training Theories: Students should explain:- - Importance of preparing and applying preventive maintenance schedule - Importance of Preparing and use safety signs and color code - Importance of Planning and conducting preventive maintenance training Circumstantial knowledge Detailed knowledge about: - Safety precautions while planning preventive maintenance - Safe handling of tools and equipment - Waste disposal		
		(b) Performing preventive maintenance of working environment	Brainstorm Guide students to define terms Demonstration Demonstrate to students on how to perform preventive	Students should be able to: - Interpret service manuals - Read and apply rules and regulations	Preventive maintenance of working environment are performed as per workshop standards.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Follow good environmental practices Principles: Students should explain the principles of: - Perform preventive	The following tools, equipment and safety gears are to be available: - General hand foot kit - Workshop tools, equipment and machines	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			maintenance of working environment Practical work Guide students on how to Perform preventive maintenance of working environment	• Monitor good and environmental practices • Clean tools and equipment • Store tools and equipment		maintenance of working environment Theories: Students should explain: - • Importance of follow good environmental practices Circumstantial knowledge Detailed knowledge about: • Safety precautions while performing preventive maintenance of working environment • Safe handling of tools and equipment • Waste disposal	• Service manuals • Workshop rules and regulations • Gloves • Overall • Safety boots • Safety clear glasses • Helmet • Mask • Ear plug	
6.0. Maintaining agricultural machinery	6.1. Servicing harvesters	(a) Servicing trailed harvesters.	Brainstorm Guide students to define trailed harvesters. Demonstration Demonstrate to students on how to service trailed harvesters Practical work Guide students on how to Service trailed	Students should be able to: • Select tools and equipment. • Inspect trailed harvesters and components. • Dismantle trailed harvesters and components. • Identify	Serviced trailed harvesters conforms to technical specifications.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Inspect trailed harvesters faults. • Dismantle and assemble trailed harvester components. • Service trailed harvesters. • Test trailed harvesters. Principles: Students should explain the principle of: • trailed harvester construction.	The following tools, equipment and safety gears are to be available: • Trailed harvesters. • Self-propelled harvester. • Tool kit. • Grease gun. • Oil can. • Service manual. • Welding machine. • Jack.	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	Product/Services Assessment	Knowledge Assessment		
			harvesters	- defects. - Service trailed harvesters and components. - Assemble trailed harvesters components. - Perform relevant adjustments. - Observe safety precautions - Test harvester - Clean tools, equipment and work place. - Store tools and equipment.		- Dismantling and assembling trailed harvester components. - Servicing trailed harvesters. Theories: Students should explain: - trailed harvester construction. - Different types of trailed harvesters. - Procedures of servicing trailed harvesters. - The harvesting mechanism. - Procedure for testing trailed harvesters Circumstantial knowledge: Detailed knowledge about: - Safety precautions while performing service of trailed harvesters. - Safe handling of working tools and equipment. - Waste disposal.	- Work bench. - Vice. - Power supply. - Lifting trolley. - Hand grinder. - Safety boots. - Safety goggles. - Gloves. - Overall.	
		(b) Service self-propelled harvesters.	Brainstorm Guide students to define self-propelled	Students should be able to: Select tools and	Serviced self-propelled harvester	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to:	The following tools, equipment and safety gears are to be available:	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			harvesters. Demonstration Demonstrate to students on how to Service self-propelled harvesters Practical work Guide students on how to Service self-propelled harvesters	equipment. - Inspect self-propelled harvesters and components. - Dismantle self-propelled harvesters and components. - Identify defects. - Service self-propelled harvesters and components. - Assemble self-propelled harvesters components. - Perform relevant adjustments. - Observe safety precautions - Test self-propelled	conforms to technical specifications.	- Inspect self-propelled harvester faults. - Dismantle and assemble self-propelled harvester components. - Service self-propelled harvester. - Test self-propelled harvester Principles: Students should explain the principle of: - Self-propelled harvester construction. - Dismantling and assembling self-propelled harvester components. - Servicing self-propelled harvester. Theories: Students should explain: - Self-propelled harvester construction. - Different types of self-propelled harvester. - Procedures of servicing self-propelled harvester. - The harvesting mechanism. - Procedure for testing self-propelled harvester	- Trailed harvesters. - Self-propelled harvester - Tool kit - Grease gun. - Oil can. - Service manual. - Welding machine. - Jack. - Work bench. - Vice. - Power supply. - Lifting trolley. - Hand grinder. - Safety boots. - Safety goggles. - Gloves. - Overall.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				harvesters. • Clean tools, equipment and work place. • Store tools and equipment.		Circumstantial knowledge: Detailed knowledge about: • Safety precautions while performing service of self-propelled harvester. • Safe handling of working tools and equipment. • Waste disposal.		
	6.2. Operating agricultural machinery	(a) Performing Pre-Operation Checks and Tractor driving.	Brainstorm Guide students to define terms Demonstration Demonstrate to students on how to perform Pre-Operation Checks and Tractor driving Practical work Guide students on how to Perform Pre-Operation Checks and Tractor driving	Students should be able to: • Interpret technical drawings. • Use service manuals. • Select tools and equipment. • Carry out pre-operation checks. • Observe safety precautions • Start and stop the engine. • Drive	Agricultural machinery operated according to technical Specifications.	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to: • Operate agricultural machinery. • Conduct pre-operational checks. • Undertake machines preventive maintenance. Principles: Students should explain the principle of: • Operating agricultural machinery. • Servicing agricultural machinery. Theories: Students should: • Describe agricultural machinery operations. • Explain importance of preventive maintenance	The following tools, equipment and safety gears are to be available: • Tractor. • Tillage machinery. • Planting machinery. • Weeding machinery. • Trailed machinery. • Spraying machinery. • Fertilizing machinery. • Tool kit. • Wheel spanners. • Jack.	70

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				machinery forward and backward. • Stop the machinery. • Interpret road signs. • Clean tools, equipment and work place. • Store tools and equipment.		on agricultural machines. • Explain uses of Global Positioning System instrument in agricultural. • Outline maintenance schedule of different agricultural machine. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while operating agricultural machinery. • Safe handling of working tools and equipment. • Waste disposal.	• Oil can. • Grease pump. • Funnel. • Hydrometer. • Service manuals. • Stethoscope. • Helmet. • Overall. • Global Positioning System Instrument (GPS). • Tape measure. • Safety clear glasses. • Gloves • Safety boots.	
		(b) Operating Tractor Attachments and Implements.	Brainstorm Guide students to define terms, analyze tractor pre operation checks Demonstration Demonstrate to students on how to Operate Tractor	Students should be able to: • Interpret technical drawings. • Use service manuals. • Select tools and equipment. • Observe safety	Agricultural Implements operated according to technical Specifications.	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to: • Operate agricultural machine implements. • Undertake agricultural machine implements preventive maintenance. Principles: Students should explain the principle of: • Operating agricultural	The following tools, equipment and safety gears are to be available: • Tractor. • Tillage machinery. • Planting machinery. • Weeding machinery. • Trailed	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Attachments and Implements Practical work Guide students on how to Operate Tractor Attachments and Implements	precautions - Hitch at single and three point linkage. - Attach trailed implements to drawbar. - Attach driven implements to P.T.O. - Operate agricultural machinery with trailer. - Clean tools, equipment and work place. - Store tools and equipment.		machine implements. - Servicing agricultural machine implements Theories: Students should: - Describe agricultural machine implements operations. - Explain the importance of preventive maintenance on agricultural machine implements - Outline maintenance schedule of different agricultural machine implements. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while operating agricultural machine implements. - Safe handling of working tools and equipment. - Waste disposal.	machinery. - Spraying machinery. - Fertilizing machinery. - Tool kit. - Wheel spanners. - Jack. - Oil can. - Grease pump. - Funnel. - Hydrometer. - Service manuals. - Stethoscope. - Helmet. - Overall. - Global Positioning System Instrument (GPS). - Tape measure. - Safety clear glasses. - Gloves - Safety boots.	
7.0. Servicing agricultural pumps	7.1. Servicing centrifugal	(a) Performing adjustments on centrifugal	Brainstorm Guide students to define terms Demonstration	Students should be able to: Interpret technical drawings.	Serviced centrifugal pump conform to technical	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to: Perform adjustments on	The following tools, equipment and safety gears are to be available: Centrifugal	23

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
	pumps	pumps	Demonstrate to students on how to perform adjustments on centrifugal pumps Practical work Guide students on how to Perform adjustments on centrifugal pumps	• Select tools and equipment. • Perform relevant adjustments. • Observe safety precautions • Test centrifugal pump. • Clean tools, equipment and work place. • Store tools and equipment.	Specifications.	centrifugal pumps. Principles: Students should explain the principle of: • Pump alignment. • Pump, levelling and balancing • Pump lowering. Theories: Students should explain: • Different types and size of centrifugal pump. • Safety precautions on servicing centrifugal pumps. • Describe fluid mechanics. • Explain pressure force and friction. • Functions of centrifugal pump. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while performing service of centrifugal pump. • Safe handling of working tools and equipment. • Waste disposal.	pump. • Tool kit. • Grease gun. • Oil can. • Service manual. • Lifting and lowering tools. • Welding machine. • Hacksaw. • Tripod stand. • Chain block mechanism. • Drill machine. • Pipe clamp. • Bench vice. • Wheel barrow. • Try square. • Tap and dies. • Hand grinder. • Power supply. • Safety boots. • Safety goggles. • Gloves. • Overall. • Helmet.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
		(b) Disassembling and assembling centrifugal pumps	Brainstorm Guide students to define terms Demonstration Demonstrate to students on how to disassemble and assemble centrifugal pumps Practical work Guide students on how to disassemble and assemble centrifugal pumps	Students should be able to: • Interpret technical drawings. • Select tools and equipment. • Inspect centrifugal pump. • Dismantle centrifugal pump. • Identify defects. • Service centrifugal pump. • Assemble centrifugal pump. • Observe safety precautions • Test centrifugal pump. • Clean tools, equipment and work place.	Assembled centrifugal pump conform to technical Specifications.	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to • Disassemble and assemble centrifugal pumps. Principles: Students should explain the principle of: • Centrifugal pump dismantling. • Centrifugal pump servicing. • Centrifugal pump assembling. • Centrifugal pump installation. Theories: Students should explain: • Important of Disassemble and assemble centrifugal pumps • Procedure of Disassemble and assemble centrifugal pumps • Safety precautions on dismantling and assembly of centrifugal pumps. Circumstantial	The following tools, equipment and safety gears are to be available: • Centrifugal pump. • Tool kit. • Grease gun. • Oil can. • Service manual. • Lifting and lowering tools. • Welding machine. • Hacksaw. • Tripod stand. • Chain block mechanism. • Drill machine. • Pipe clamp. • Bench vice. • Wheel barrow. • Try square. • Tap and dies. • Hand grinder. • Power supply. • Safety boots. • Safety goggles. • Gloves. • Overall.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				Store tools and equipment.		knowledge: Detailed knowledge about: - Safety precautions while disassemble and assemble centrifugal pumps - Safe handling of working tools and equipment. - Waste disposal.	Helmet.	
	7.2. Servicing plunger pumps	(a) Performing adjustment of plunger pumps	Brainstorm Guide students to define plunger pumps Demonstration Demonstrate to students on how to perform adjustment of plunger pumps Practical work Guide students on how to Perform adjustment of plunger pumps	Students should be able to: - Interpret drawings. - Select tools and equipment. - Inspect the plunger pump. - Perform relevant adjustments. - Observe safety precautions. - Test plunger pump. - Clean tools, equipment and work	Adjustment of plunger pumps performed conform to technical Specifications.	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to: - Perform adjustment of plunger pumps. Principles: Students should explain the principles of: - Pump alignment. - Pump levelling and balancing - Pump lowering. Theories: Students should explain: - Outline different types and sizes of plunger pumps. - Safety precautions on servicing plunger pumps. - Describe fluid mechanics.	The following tools, equipment and safety gears are to be available: - Plunger pump. - Tool kit. - Grease gun. - Oil can. - Service manual. - Lifting and lower tools. - Welding machines. - Hacksaw. - Tripod stand. - Chain blocks mechanism. - Drill machine. - Pipe clamp. - Bench vice.	23

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				place. Store tools and equipment.		- Explain pressure, force and friction. - Functions of plunger pumps. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while performing adjustment of plunger pumps. - Safe handling of working tools and equipment. - Waste disposal.	- Wheel barrow. - Try square. - Tap and dies - Hand grinder. - Power supply. - Safety boots. - Safety goggles. - Gloves. - Overall. - Helmets.	
		(b) Disassemble and assemble plunger pumps	Brainstorm Guide students to define terms Demonstration Demonstrate to students on how to Disassemble and assemble plunger pumps Practical work Guide students on how to disassemble and assemble	Students should be able to: - Interpret drawings. - Select tools and equipment. - Inspect plunger pump. - Dismantle plunger pump. - Identify defects. - Service plunger	Assembled plunger pumps conform to technical Specifications.	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to: - Disassemble and assemble plunger pumps Principles: Students should explain the principle of: - Plunger pumps dismantling. - Plunger pumps servicing. - Plunger pumps assembling. - Plunger pumps installation. Theories: Students should	The following tools, equipment and safety gears are to be available: - Plunger pump. - Tool kit. - Grease gun. - Oil can. - Service manual. - Lifting and lower tools. - Welding machines. - Hacksaw. - Tripod stand.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			plunger pumps	pump. - Assemble plunger pump. - Observe safety precautions - Test plunger pump. - Clean tools, equipment and work place. - Store tools and equipment.		explain: - Important of Disassemble and assemble Plunger pumps - Procedure of Disassemble and assemble Plunger pumps - Safety precautions on dismantling and assembly of Plunger pumps Circumstantial knowledge: Detailed knowledge about: - Safety precautions while performing service of plunger pump. - Safe handling of working tools and equipment. - Waste disposal.	- Chain blocks mechanism. - Drill machine. - Pipe clamp. - Bench vice. - Wheel barrow. - Try square. - Tap and dies - Hand grinder. - Power supply. - Safety boots. - Safety goggles. - Gloves. - Overall. - Helmets.	
	7.3. Servicing impeller pumps	(a) Perform adjustment on impeller pumps	Brainstorm Guide students to define impeller pumps Demonstration Demonstrate to students on how to Perform adjustment on	Students should be able to: - Interpret drawings. - Select tools and equipment. - Inspect impeller pump.	Impeller pump performed conform to technical Specifications.	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to; - Perform adjustment on impeller pumps. Principles: Students should explain the principles of: - Pump alignment. - Pump levelling and	The following tools, equipment and safety gears are to be available: - Impeller pumps. - Tool kit. - Grease gun. - Oil can. - Service manual.	23

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			impeller pumps Practical work Guide students on how to Perform adjustment on impeller pumps	- Perform relevant adjustment - Assemble impeller pump. - Observe safety precautions - Test impeller pump. - Clean tools, equipment and work place. - Store tools and equipment.		balancing. - Pump lowering. Theories: Students should explain: - Different types and sizes of impeller pumps. - Safety precautions on servicing impeller pumps. - Describe fluid mechanics. - Explain pressure, force and friction. - Functions of impeller pumps. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while performing adjustment for the impeller pump. - Safe handling of working tools and equipment. - Waste disposal.	- Lifting and lowering equipment. - Welding machines. - Hacksaw. - Tripod stand. - Chain blocks mechanism. - Drill machine. - Pipe clamp. - Bench vice. - Wheel barrow. - Try square. - Tap and dies - Hand grinder. - Power supply. - Safety boots. - Safety goggles. - Gloves. - Overall. - Helmet.	
		(b) Disassembling and assembling impeller	Brainstorm Guide students to describe impeller pump	Students should be able to: - Interpret drawings. - Select tools	Serviced impeller pump conform to technical	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to: Disassemble and	The following tools, equipment and safety gears are to be available: Impeller pumps.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
		pumps.	Demonstration Demonstrate to students on how to disassemble and assemble impeller pumps. Practical work Guide students on how to disassemble and assemble impeller pumps.	and equipment. - Inspect impeller pump. - Dismantle impeller pump. - Identify defects. - Service impeller pump. - Perform relevant adjustment. - Assemble impeller pump. - Observe safety precautions. - Test impeller pump. - Clean tools, equipment and work place. - Store tools and equipment.	Specifications.	assemble impeller pumps. Principles: Students should explain the principles of: - Dismantling impeller pumps. - Servicing impeller pumps. - Assembling the impeller pumps. - Installation of impeller pumps. Theories: Students should explain: - Important of Disassemble and assemble impeller pumps - Procedure of Disassemble and assemble impeller pumps - Safety precautions on dismantling and assembly of impeller pumps Circumstantial knowledge: Detailed knowledge about: - Safety precautions while dismantling and assembly of impeller pumps.	- Tool kit. - Grease gun. - Oil can. - Service manual. - Lifting and lowering equipment. - Welding machines. - Hacksaw. - Tripod stand. - Chain blocks mechanism. - Drill machine. - Pipe clamp. - Bench vice. - Wheel barrow. - Try square. - Tap and dies - Hand grinder. - Power supply. - Safety boots. - Safety goggles. - Gloves. - Overall. - Helmet.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						- Safe handling of working tools and equipment. - Waste disposal.		
	7.4. Servicing gear type pumps	(a) Performing adjustment on gear pumps.	Brainstorm Guide students to define terms Demonstration Demonstrate to students on how to perform adjustment on gear pumps Practical work Guide students on how to Perform adjustment on gear pumps	Students should be able to: - Interpret drawings. - Select tools and equipment. - Inspect gear type pump. - Perform relevant adjustment - Observe safety precautions - Test gear type pump. - Clean tools, equipment and work place. - Store tools and equipment.	Adjustment on gear pumps performed conforms to technical Specifications.	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to service different types of gear pumps. Principles: Students should explain the principle of: - Pump alignment. - Pump levelling and balancing. - Pump lowering. Theories: Students should explain: - Different types and sizes of gear pumps. - Safety precautions on servicing gear pumps. - Describe fluid mechanics. - Explain pressure, force and friction. - Functions of gear pumps. Circumstantial knowledge: Detailed knowledge about:	The following tools, equipment and safety gears are to be available: - Gear type pump. - Tool kit. - Grease gun. - Oil can. - Service manual. - Lifting and lowering tools. - Welding machines. - Hacksaw. - Tripod stand. - Chain blocks mechanism. - Drill machine. - Pipe clamp. - Bench vice. - Wheelbarrow. - Tap and dies. - Hand grinder. - Power supply. - Safety boots. - Safety goggles.	23

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						• Safety precautions while performing adjustments on gear pumps. • Safe handling of working tools and equipment. • Waste disposal.	• Gloves. • Helmet. • Overall.	
		(b) Disassembling and assembling gear type pumps.	Brainstorm Guide students to define terms Demonstration Demonstrate to students on how to disassemble and assemble gear type pumps. Practical work Guide students on how to disassemble and assemble gear type pumps.	Students should be able to: • Interpret drawings. • Select tools and equipment. • Inspect gear type pump. • Dismantle gear pump. • Identify defects. • Service gear type pump. • Assemble gear type pump. • Observe safety precautions. • Test gear type pump. • Clean tools,	Disassembled and assembled gear type pumps performed conforms to technical Specifications.	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to: • Disassemble and assemble gear type pumps. Principles: Students should explain the principle of: • Dismantling of gear pumps. • Servicing the gear pumps. • Assembling of gear pumps. Theories: Students should explain: • Important of Disassembling and assembling gear type pumps. • Procedure of Disassemble and assemble gear type pumps.	The following tools, equipment and safety gears are to be available: • Gear type pump. • Tool kit. • Grease gun. • Oil can. • Service manual. • Lifting and lowering tools. • Welding machines. • Hacksaw. • Tripod stand. • Chain blocks mechanism. • Drill machine. • Pipe clamp. • Bench vice. • Wheel barrow. • Tap and dies. • Hand grinder. • Power supply.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				equipment and work place. • Store tools and equipment.		• Safety precautions on dismantling and assembly of gear type pumps. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while performing service of gear type pumps. • Safe handling of working tools and equipment. • Waste disposal.	• Safety boots. • Safety goggles. • Gloves. • Helmet. • Overall.	
	7.5. Servicing piston pumps	(a) Performing adjustment on piston pumps.	Brainstorm Guide students to define piston pumps Demonstration Demonstrate to students on how to perform adjustment on piston pumps. Practical work Guide students on how to perform	Students should be able to: • Interpret drawings. • Select tools and equipment. • Inspect piston pumps. • Perform relevant adjustment • Observe safety precautions	Adjustment on piston pumps performed conforms to technical Specifications.	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to: • Perform adjustment on piston pumps. Principles: Students should explain the principle of: • Pump alignment. • Pump levelling and balancing. • Pump lowering. Theories: Students should explain: • Different types and sizes of piston pumps.	The following tools, equipment and safety gears are to be available: • Piston pumps. • Tool kits. • Grease gun. • Oil can. • Service manual. • Lifting and lowering tools. • Welding machines. • Hacksaw. • Tripod stand.	23

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			adjustment on piston pumps.	• Test piston pump. • Clean tools, equipment and work place. • Store tools and equipment.		• Safety precautions on servicing piston pumps. • Describe fluid mechanics. • Explain pressure, force and friction. • Functions of piston pumps. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while performing adjustments on piston pumps • Safe handling of working tools and equipment. • Waste disposal.	• Chain block machine. • Drill machine. • Pipe clamp. • Bench vice. • Wheel barrow. • Tap and dies. • Hand grinder. • Power supply. • Safety boots. • Safety goggles. • Gloves • Helmet. • Overall.	
		(b) Disassembling and assembling piston pumps.	Brainstorm Guide students to define terms Demonstration Demonstrate to students on how to disassemble and assemble piston pumps. Practical work Guide students	Students should be able to: • Interpret drawings. • Select tools and equipment. • Inspect piston pumps. • Dismantle piston pumps.	Disassemble and assembled piston pumps performed conforms to technical Specifications.	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to service different types of piston pumps. Principles: Students should explain the principle of: • Dismantling piston pumps. • Servicing piston pumps. • Assembling piston pumps.	The following tools, equipment and safety gears are to be available: • Piston pumps. • Tool kits. • Grease gun. • Oil can. • Service manual. • Lifting and lowering tools. • Welding	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			on how to disassemble and assemble piston pumps.	- Identify defects. - Service piston pumps. - Assemble piston pumps. - Observe safety precaution - Clean tools, equipment and work place. - Store tools and equipment.		- Installation of piston pumps. Theories: Students should explain: - Important of Disassemble and assemble piston pumps. - Procedure of Disassemble and assemble piston pumps. - Safety precautions on dismantling and assembly of piston pumps Circumstantial knowledge: Detailed knowledge about: - Safety precautions while performing service of piston pumps. - Safe handling of working tools and equipment. - Waste disposal.	- machines. - Hacksaw. - Tripod stand. - Chain block machine. - Drill machine. - Pipe clamp. - Bench vice. - Wheel barrow. - Tap and dies. - Hand grinder. - Power supply. - Safety boots. - Safety goggles. - Gloves - Helmet. - Overall.	
	7.6. Servicing diaphragm pumps	(a) Performing adjustment on diaphragm pumps.	Brainstorm Guide students to define terms Demonstration Demonstrate to students on how	Students should be able to: - Interpret drawings. - Select tools and equipment.	Adjustment on diaphragm pumps performed conforms to technical	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to: Perform adjustment on diaphragm pumps. Principles: Students should	The following tools, equipment and safety gears are to be available: - Diaphragm pump. - Tool kit.	23

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			to perform adjustment on diaphragm pumps Practical work Guide students on how to disassemble and assemble piston pumps.	- Inspect diaphragm pumps. - Perform relevant adjustment - Observe safety precautions. - Test diaphragm pumps. - Clean tools, equipment and work place. - Store tools and equipment.	Specifications.	explain the principle of: - Installation of diaphragm pumps. - Pump alignment. - Pump levelling and balancing. - Pump lowering. Theories: Students should explain: - Different types and sizes of diaphragm pumps. - Safety precautions on servicing diaphragm pumps. - Describe fluid mechanics. - Explain pressure, force and friction. - Functions of piston pumps. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while performing service of diaphragm pumps. - Safe handling of working tools and equipment. - Waste disposal.	- Grease gun. - Oil can. - Service manual. - Lifting and lowering tools. - Welding machines. - Hacksaw. - Tripod stand. - Chain block mechanism. - Drill machine. - Pipe clamp. - Bench vice. - Try square - Wheel barrow. - Tap and dies. - Hand grinder - Power supply. - Safety boots. - Safety goggles. - Gloves - Helmet. - Overall.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
		(b) Disassembling and assembling diaphragm pumps.	Brainstorm Guide students to define terms Demonstration Demonstrate to students on how to disassemble and assemble diaphragm pumps Practical work Guide students on how to disassemble and assemble diaphragm pumps	Students should be able to: • Interpret drawings. • Select tools and equipment. • Inspect diaphragm pumps. • Dismantle diaphragm pumps. • Identify defects. • Service diaphragm pumps. • Assemble diaphragm pumps. • Observe safety precautions • Test diaphragm pumps. • Clean tools, equipment and work place. • Store tools	Disassembled and assembled diaphragm pumps performed conforms to technical Specifications.	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to: • Disassemble and assemble diaphragm pumps Principles: Students should explain the principle of: • Dismantling diaphragm pumps. • Servicing diaphragm pumps. • Assembling diaphragm pumps. • Installation of diaphragm pumps. Theories: Students should explain: • Important of Disassemble and assemble diaphragm pumps • Procedure of Disassemble and assemble diaphragm pumps • Safety precautions on dismantling and assembly of diaphragm pumps Circumstantial	The following tools, equipment and safety gears are to be available: • Diaphragm pump. • Tool kit. • Grease gun. • Oil can. • Service manual. • Lifting and lowering tools. • Welding machines. • Hacksaw. • Tripod stand. • Chain block mechanism. • Drill machine. • Pipe clamp. • Bench vice. • Try square • Wheel barrow. • Tap and dies. • Hand grinder • Power supply. • Safety boots. • Safety goggles. • Gloves • Helmet. • Overall.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				and equipment.		knowledge: Detailed knowledge about: - Safety precautions while dismantling and assembly of diaphragm pumps. - Safe handling of working tools and equipment. - Waste disposal.		
	7.7. Servicing submersible pumps	(a) Servicing submersible pumps	Brainstorm Guide students to define submersible pumps Demonstration Demonstrate to students on how to Service submersible pumps Practical work Guide students on how to Service submersible pumps	Students should be able to: - Interpret drawings. - Select tools and equipment. - Inspect submersible pumps. - Identify defects. - Service submersible pumps. - Perform relevant adjustment - Observe safety precautions	Serviced submersible pumps conforms to technical Specifications.	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to: - Service different types of submersible pumps. Principles: Students should explain the principle of: - Servicing submersible pumps. - Pump alignment. - Pump levelling and balancing. - Pump lowering. Theories: Students should explain: - Outline different types and sizes of submersible pumps. - Safety precautions on servicing submersible	The following tools, equipment and safety gears are to be available: - Submersible pumps. - Tool kit. - Grease gun. - Oil can. - Service manual. - Lifting and lowering tools. - Welding machines. - Hacksaw. - Tripod stand. - Chain block. - Drill machine. - Pipe clamp. - Bench vice.	23

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				• Test submersible pumps. • Clean tools, equipment and work place. • Store tools and equipment.		pumps. • Describe fluid mechanics. • Explain pressure, force and friction. • Outline functions of submersible pumps. • Explain pump electrical components and their functions. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while performing service of submersible pumps. • Safe handling of working tools and equipment. • Waste disposal.	• Multimeter. • Wheel barrow. • Try square. • Tap and dies. • Hand grinder. • Power supply. • Safety goggles. • Gloves. • Overall. • Helmet. • Safety boots.	
		(b) Dismantling and assembling submersible pumps	Brainstorm Guide students to define terms Demonstration Demonstrate to students on how to dismantle and assemble submersible pumps	Students should be able to: • Interpret drawings. • Select tools and equipment. • Inspect submersible pumps. • Dismantle	Dismantle and assemble pump conforms to technical Specifications.	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to: • Dismantle and assemble pump. Principles: Students should explain the principles of: • Dismantling submersible pumps. • Servicing submersible	The following tools, equipment and safety gears are to be available: • Submersible pumps. • Tool kit. • Grease gun. • Oil can. • Service manual.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Practical work Guide students on how to dismantle and assemble submersible pumps	submersible pumps. - Identify defects. - Service submersible pumps. - Assemble submersible pumps. - Observe safety precautions - Test submersible pumps. - Clean tools, equipment and workplace. - Store tools and equipment.		pumps. - Assembling submersible pumps. Theories: Students should explain: - Important of Disassemble and assemble submersible pumps - Procedure of Disassemble and assemble submersible pumps - Safety precautions on dismantling and assembly of submersible pumps. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while dismantling and assembly of submersible pumps. - Safe handling of working tools and equipment. - Waste disposal.	- Lifting and lowering tools. - Welding machines. - Hacksaw. - Tripod stand. - Chain block. - Drill machine. - Pipe clamp. - Bench vice. - Multimeter. - Wheel barrow. - Try square. - Tap and dies. - Hand grinder. - Power supply. - Safety goggles. - Gloves. - Overall. - Helmet. - Safety boots.	
	7.8. Performing	(a) Servicing irrigation equipment	Brainstorm Guide students to define terms	Students should be able to: Select tools	Irrigation equipment's serviced per	Knowledge evidence: Detailed knowledge of: Methods used: Students	The following tools, equipment and safety gears are to	23

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
	irrigation	nt	Demonstration Demonstrate to students on how to Service irrigation equipment Practical work Guide students on how to Service irrigation equipment	and equipment. • Interpret technical drawing. • Service irrigation equipment • Observe safety precautions • Clean tools, equipment and workplace. • Store tools, equipment and materials.	technical Specifications.	should explain how to: • Service irrigation equipment. Principles: Students should explain the principles of: • Procedure of Service irrigation equipment. Theories: Students should explain: • Explain the importance of regularly servicing irrigation equipment • Explain the steps involved in inspecting irrigation equipment • Explain the role of cleaning in maintaining irrigation systems • Explain how to check for leaks in an irrigation system • Explain the importance of lubricating moving parts in irrigation equipment Circumstantial knowledge: Detailed knowledge about: • Safety precautions while servicing irrigation equipment.	be available: • Drill machine. • Pipe clamp. • Bench vice. • Multimeter. • Tap and dies. • Computer with internet facility. • Drip line • Blind pipe • Plumbing fittings • Gallon • Tank • Filters • Emitter • Spanner • Service manuals. • Overall. • Safety boots. • Safety clear glasses. • Helmet. • Safety goggles. • Gloves.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						- Safe handling of working tools and equipment. - Waste disposal		
		(b) Assembling and disassembling irrigation equipment	Brainstorm Guide students to define terms. Demonstration Demonstrate to students on how to assemble and disassemble irrigation equipment Practical work Guide students on how to assemble and disassemble irrigation equipment	Students should be able to: - Select tools and equipment. - Interpret technical drawing. - Assemble and disassemble irrigation equipment. - Observe safety precautions - Clean tools, equipment and work place. - Store tools, equipment and material.	Assembled and disassembled irrigation equipment per technical Specifications.	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to: - Assemble and disassemble irrigation equipment Principles: Students should explain the principle of: - Procedure of assemble and disassemble irrigation equipment. Theories: Students should explain: - Procedure of disassembling and assembling irrigation equipment - Safety precautions on dismantling and assembly of irrigation equipment. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while perform drip irrigation	The following tools, equipment and safety gears are to be available: - Drill machine. - Pipe clamp. - Bench vice. - Multimeter. - Tap and dies. - Computer with internet facility. - Drip line - Blind pipe - Plumbing fittings - Gallon - Tank - Filters - Emitter - Spanner - Service manuals. - Overall. - Safety boots. - Safety clear glasses. - Helmet. - Safety goggles. - Gloves.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						installation. • Safe handling of working tools and equipment. Waste disposal		
		(c) Perform drip irrigation installation	Brainstorm Guide students to define Drip irrigation Demonstration Demonstrate to students on how to perform drip irrigation installation Practical work Guide students on how to perform drip irrigation installation	Students should be able to: • Select tools and equipment. • Interpret technical drawing. • Design drip irrigation system • Observe safety precautions • Clean tools, equipment and work place. • Store tools, equipment and material.	Drip irrigation installed as per technical Specifications.	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain different ways of Design drip irrigation Principles: Students should explain the principle of: • Selecting material based on size. • Selecting material based on cost. Theories: Students should explain: • Function of components parts of Drip irrigation. • Procedure for drip irrigation installation. • Drip irrigation costing calculations. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while perform drip irrigation installation. • Safe handling of	The following tools, equipment and safety gears are to be available: • Drill machine. • Pipe clamp. • Bench vice. • Multimeter. • Tap and dies. • Computer with internet facility. • Drip line • Blind pipe • Plumbing fittings • Gallon • Tank • Filters • Emitter • Spanner • Service manuals. • Overall. • Safety boots. • Safety clear glasses. • Helmet. • Safety goggles.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						working tools and equipment. • Waste disposal	Gloves.	
8.0. Management of agricultural machinery	8.1. Performing land surveying	(a) Carrying out chain survey	Brainstorm Guide students to define chain survey, identify uses of survey Demonstration Demonstrate to students on how to carry out chain survey Practical work Guide students on how to carry out chain survey	Students should be able to: • Interpret technical drawings. • Use service manuals. • Select tools and equipment. • Carry out chain survey • Observe safety precautions • Clean tools, equipment and work place. • Store tools and equipment.	Chain surveying according to Technical specifications	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to: • Use chain survey data to draw maps or plans • Undertake tools and machines preventive maintenance. Principles: Students should explain the principle of: • Carry out chain survey Theories: Students should: • Define the various terms used in chain survey • Record chain survey data in the notebook as per standards • Record data and correct errors in chain survey using standard methods • Use chain survey data to draw maps or plans Circumstantial knowledge: Detailed knowledge about: • Safety precautions while performing with chain	The following tools, equipment and safety gears are to be available: • Surveying tripods • Surveying bipods • Fiberglass grade rods • Builder's grade rods • Story poles • Laser levels • Auto-levels • Transit levels • Hand levels • Abney levels • Surveyor's brush axes • Land surveying markers • Land surveying rods • Marking paint • Surveying prisms • Prism poles • GNSS equipment • Total stations	55

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						survey tools. • Safe handling of working tools and equipment. Waste disposal.	• GPS equipment • Property corner pin finders • Bags and cases • Surveyor's roll flagging • Theodolites • Transits • Mag nails • PK nails • Magnetic locators • Tribachs • Land surveying adapters • Tape measure. • Overall Safety boots.	
		(b) Carrying out compass survey	Brainstorm Guide students to define compass survey Demonstration Demonstrate to students on how to carry out compass survey Practical work Guide students	Students should be able to: • Interpret technical drawings. • Use service manuals. • Select tools and equipment. • Carry out compass survey	Compass survey carried out according to Technical specifications	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to: • Use Compass survey data to draw maps or plans • Undertake tools and machines preventive maintenance. Principles: Students should explain the principle of: • Carry out a compass	The following tools, equipment and safety gears are to be available: • Surveying tripods • Surveying bipods • Fiberglass grade rods • Aluminium grade rods • Builder's grade rods	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			on how to carry out compass survey	- Observe safety precautions - Clean tools, equipment and work place. - Store tools and equipment.		survey Theories: Students should: - Define compass survey - Record compass survey data in the notebook as per standards - Record data and correct errors in compass survey using standard methods - Use compass survey data to draw maps or plans Circumstantial knowledge: Detailed knowledge about: - Safety precautions while performing with compass survey tools. - Safe handling of working tools and equipment. - Waste disposal.	- Story poles - Laser levels - Auto-levels - Transit levels - Hand levels - Abney levels - Surveyor's brush axes - Land surveying markers - Land surveying rods - Marking paint - Surveying prisms - Prism poles - GNSS equipment - Total stations - GPS equipment - Property corner pin finders - Bags and cases - Surveyor's roll flagging - Theodolites - Transits - Mag nails - PK nails - Magnetic locators - Tribachs - Land surveying	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
							adapters • Tape measure. • Overall	
		(c) Carrying out levelling survey	Brainstorm Guide students to define terms, identify importance of levelling Demonstration Demonstrate to students on how to Carry out levelling survey Practical work Guide students on how to carry out levelling survey	Students should be able to: • Interpret technical drawings. • Use service manuals. • Select tools and equipment. • Carry out levelling survey • Observe safety precautions • Clean tools, equipment and work place. • Store tools and equipment.	levelling survey carried out according to Technical specifications	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to: • Use levelling survey data to draw maps or plans Principles: Students should explain the principle of: • Carry out levelling survey Theories: Students should: • Define the various terms used in levelling survey • Record levelling survey data in the notebook as per standards • Record data and correct errors in levelling survey using standard methods Circumstantial knowledge: Detailed knowledge about: • Safety precautions while performing with levelling survey tools. • Safe handling of	The following tools, equipment and safety gears are to be available: • Surveying tripods • Surveying bipods • Fiberglass grade rods • Aluminium grade rods • Builder's grade rods • Story poles • Laser levels • Auto-levels • Transit levels • Hand levels • Abney levels • Surveyor's brush axes • Land surveying markers • Land surveying rods • Marking paint • Surveying prisms	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						working tools and equipment. • Waste disposal.	• Prism poles • GNSS equipment • Total stations • GPS equipment • Property corner pin finders • Bags and cases • Surveyor's roll flagging • Theodolites • Transits • Mag nails • PK nails • Magnetic locators • Tribachs • Land surveying adapters • Tape measure. • Overall	
		(d) Carrying out contour survey	Brainstorm Guide students to define, Identify importance of contour survey Practical work Guide students on how to carry	Students should be able to: • Interpret technical drawings. • Use service manuals. • Select tools and equipment.	Land surveying according to Technical specifications	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to: • Use contour survey data to draw maps or plans • Undertake tools and machines preventive maintenance. Principles: Students should	The following tools, equipment and safety gears are to be available: • Surveying tripods • Surveying bipods • Fiberglass grade rods • Aluminium	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			out contour survey Activity Organize students in manageable group to Carry out contour survey	• Carry out contour survey • Observe safety precautions • Clean tools, equipment and work place. Store tools and equipment.		explain the principle of: • Carrying out contour survey Theories: Students should: • Define the various terms used in contour survey • Record contour survey data in the notebook as per standards Circumstantial knowledge: Detailed knowledge about: • Safety precautions while performing with contour survey tools. • Safe handling of working tools and equipment. • Waste disposal.	grade rods • Builder's grade rods • Story poles • Laser levels • Auto-levels • Transit levels • Hand levels • Abney levels • Surveyor's brush axes • Land surveying markers • Land surveying rods • Marking paint • Surveying prisms • Prism poles • GNSS equipment • Total stations • GPS equipment • Property corner pin finders • Bags and cases • Surveyor's roll flagging • Theodolites • Transits • Mag nails • PK nails • Magnetic	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
							locators • Tribachs • Land surveying adapters • Tape measure. • Overall Safety boots.	
		(e) Use GPS to plot different survey data.	Brainstorm Guide students to define, identify function of GPS Practical work Guide students on how to Use GPS to plot different survey data Activity Organize students in manageable group to Use GPS to plot different survey data.	Students should be able to: • Interpret technical drawings. • Use service manuals. • Select tools and equipment. • Use GPS to plot different survey data • Observe safety precautions • Clean tools, equipment and work place. Store tools and equipment.	Land surveying according to Technical specifications	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to: • Use GPS tools. Principles: Students should explain the principle of: • Collect data using GPS • Record GPS data • Use software to plot GPS data Theories: Students should: • Explain uses of Global Positioning System in agricultural. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while Using GPS to plot different survey data tools. • Safe handling of	The following tools, equipment and safety gears are to be available: • Surveying tripods • Surveying bipods • Fiberglass grade rods • Aluminium grade rods • Builder's grade rods • Story poles • Laser levels • Auto-levels • Transit levels • Hand levels • Abney levels • Surveyor's brush axes • Land surveying markers • Land surveying	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
						working tools and equipment. Waste disposal.	rods • Marking paint • Surveying prisms • Prism poles • GNSS equipment • Total stations • GPS equipment • Property corner pin finders • Bags and cases • Surveyor's roll flagging • Theodolites • Transits • Mag nails • PK nails • Magnetic locators • Tribachs • Land surveying adapters • Tape measure. • Overall	
	8.2. Construct of greenhouse	(a) Planning greenhouse	Brainstorm Guide students to define, identify function of greenhouse	Students should be able to: • Interpret technical drawings. • Use service manuals.	Greenhouse construction according to technical specifications	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to: • Greenhouse construction procedure. Principles: Students should	The following tools, equipment and safety gears are to be available: • Tool kit. • Spanners. • Jack.	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	Product/Services Assessment	Knowledge Assessment		
			Practical work Guide students on how to plan for greenhouse construction Activity Organize students in manageable group to plan for greenhouse construction	- Select tools and equipment. - Observe safety precautions - Describe climatic suitability for greenhouse vegetable production - Clean tools, equipment and work place. - Store tools and equipment.		explain the principle of: - Climatic requirements of vegetables to growth on greenhouse - greenhouse local site Theories: Students should: - Describe main greenhouse types. - Describe function of the component's parts of greenhouse Circumstantial knowledge: Detailed knowledge about: - Safety precautions while construct Greenhouse. - Safe handling of working tools and equipment. - Waste disposal.	- Square Pipe - Round pipe - Plastic firm - Polythene firm - Screen - Ventilator - Hot air heater - Fan - Growing bench - Oil can. - Service manuals. - Tape measure. - Safety gears	
		(b) Performing design of greenhouse	Brainstorm Guide students to define, identify different designs of greenhouses Practical work Guide students on how to	Students should be able to: - Interpret technical drawings. - Use service manuals. - Select tools and equipment. - Observe	Greenhouse construction according to technical specifications	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to: - Greenhouse construction procedure. Principles: Students should explain the principle of: - greenhouse local site Theories: Students should: - Describe procedures for	The following tools, equipment and safety gears are to be available: - Tool kit. - Spanners. - Jack. - Square Pipe - Round pipe - Plastic firm	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			design greenhouse Activity Organize students in manageable group to perform design of greenhouse	safety precautions - Describe designs of greenhouses - Clean tools, equipment and work place. - Store tools and equipment.		designing greenhouse Circumstantial knowledge: Detailed knowledge about: - Safety precautions while construct Greenhouse. - Safe handling of working tools and equipment. - Waste disposal.	- Polythene firm - Screen - Ventilator - Hot air heater - Fan - Growing bench - Oil can. - Service manuals. - Tape measure. - Safety gears	
		(c) Performing greenhouse construction.	Brainstorm Guide students to define, identify materials used for constructing greenhouse Practical work Guide students on how to construct greenhouse Activity Organize students in manageable group to construct greenhouse	Students should be able to: - Interpret technical drawings. - Use service manuals. - Select tools and equipment. - Observe safety precautions - Describe procedures for constructing greenhouse - Clean tools, equipment	Greenhouse construction according to technical specifications	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to: •Green house construction procedure. Principles: Students should explain the principle of: • Procedures for constructing greenhouse Theories: Students should: • Describe function of the component's parts of greenhouse • Identify tools used for greenhouse construction Circumstantial knowledge: Detailed knowledge about:	The following tools, equipment and safety gears are to be available: - Tool kit. - Spanners. - Jack. - Square Pipe - Round pipe - Plastic firm - Polythene firm - Screen - Ventilator - Hot air heater - Fan - Growing bench - Oil can. - Service manuals. - Helmet.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			premises	and work place. • Store tools and equipment.		• Safety precautions while construct Greenhouse. • Safe handling of working tools and equipment. Waste disposal.	• Overall. • Tape measure. • Safety clear glasses. • Gloves • Safety boots.	
	8.3. Keep machinery records	(a) Keeping maintenance records	Brainstorm Guide students to define, identify importance of record keeping Practical work Guide students on how to keep maintenance records Activity Organize students in manageable group to keep maintenance records	Students should be able to: • Select tools and equipment. • Use service manuals. • Keep service records. • Record machines working hours. • Record machines failures. • Record performed services. • Observe safety precautions. • Keep all records safety.	Recorded machinery reports conforms to technical Specifications.	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to: • Take agricultural machinery records. • Record machinery working hours. Principles: Students should explain the principles of taking agricultural machinery records. Theories: Students should explain: • Machine failures and remedies. • Uses of agricultural machinery records. • Different machines in agriculture. • Ways of keeping records. Circumstantial knowledge: Detailed knowledge about:	The following tools, equipment and safety gears are to be available: • Agricultural machinery. • Service manuals. • Computer set. • Chair. • Table. • Calculator. • GPS instrument. • Tool kit. • Overall. • Safety clear glasses • Gloves • Safety boots. • Helmet. • Tap measure. • Timer / stop watch.	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	Product/Services Assessment	Knowledge Assessment		
				- Clean tools, equipment and work place. - Store tools and equipment.		- Safety precautions while collecting machinery records. - Safe handling of working tools and equipment. - Waste disposal.		
		(b) Observing usage time	Brainstorm Guide students to define, identify importance of using time in record keeping for machines Practical work Guide students on how to Observe usage time Activity Organize students in manageable group to Observe usage time	Students should be able to: - Select tools and equipment. - Use service manuals. - Keep service records. - Record machines working hours. - Observe safety precautions - Keep all records safety. - Clean tools, equipment and work place. - Store tools	Usage time observed conforms to technical Specifications.	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to: - Take agricultural machinery records. - Record machinery working hours. Principles: Students should explain the principles of taking agricultural machinery records. Theories: Students should explain: - Importance of Observing usage time in agricultural machinery records. Circumstantial knowledge: Detailed knowledge about: - Safety precautions while collecting machinery	The following tools, equipment and safety gears are to be available: - Agricultural machinery. - Service manuals. - Computer set. - Chair. - Table. - Calculator. - GPS instrument. - Tool kit. - Safety gears - Tap measure. - Timer / stop watch.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				and equipment.		records. • Safe handling of working tools and equipment. • Waste disposal.		
		(c) Observe type of failures.	Discussion Guide students to define, identify ways of Observing type of failures in machines Practical work Guide students on how to observe type of failures in machines Activity Organize students in manageable group to check machine failures and remedies.	Students should be able to: • Select tools and equipment. • Use service manuals. • Record machines failures. • Record performed services. • Observe safety precautions • Keep all records safety. • Clean tools, equipment and work place. • Store tools and equipment.	Observed failures in machines conforms to technical Specifications.	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to: • Check machine failures and remedies. Principles: Students should explain the principles of taking agricultural machinery records. Theories: Students should explain: • Machine failures and remedies. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while collecting machinery records. • Safe handling of working tools and equipment. • Waste disposal.	The following tools, equipment and safety gears are to be available: • Agricultural machinery. • Service manuals. • Computer set. • Chair. • Table. • Calculator. • GPS instrument. • Tool kit. • Overall. • Safety clear glasses • Gloves • Safety boots. • Helmet. • Tap measure. • Timer / stop watch.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
	8.4. Selecting proper machinery	(d) Selecting machine based on size	Brainstorm Guide students to define, identify features for selecting proper machinery Practical work Guide students on how to Select machine based on size Activity Organize students in manageable group to Select machine based on size	Students should be able to: • Select tools and equipment. • Interpret technical drawing. • Interpret proforma invoices. • Select a machine based on size. • Observe safety precautions • Select proper machines. • Clean tools, equipment and work place. • Store tools, equipment and material.	Selected machines conform to technical Specifications.	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain different ways of selecting proper agricultural machinery. Principles: Students should explain the principle of: • Selecting machine based on size. • Select proper machines. Theories: Students should explain: • Proper agricultural machinery. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while selecting machinery records. • Safe handling of working tools and equipment. • Waste disposal.	The following tools, equipment and safety gears are to be available: • Computer with internet facility. • List of suppliers of agricultural machinery. • List of existing agricultural machinery. • Agricultural machinery catalogues. • Exhaust analyzer. • Inspection pit. • Stethoscope. • Multimeter. • Pressure testing tools. • Power testing equipment. • Price list of agricultural machinery. • Calculator. • Service manuals. • Safety gears	65
		(e) Selecting	Brainstorm	Students should	Selected	Knowledge evidence:	The following tools,	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
		machinery based on cost comparison	Guide students to define, identify ways of selecting proper machine Practical work Guide students on how to Select machinery based on cost comparison Activity Organize students in manageable group to Select machinery based on cost comparison	be able to: • Select tools and equipment. • Interpret technical drawing. • Interpret proforma invoices. • Select a machine based on cost comparison • Observe safety precautions • Clean tools, equipment and work place. • Store tools, equipment and material.	machines conform to technical Specifications.	Detailed knowledge of: Methods used: Students should explain different ways of selecting proper agricultural machinery. Principles: Students should explain the principle of: • Selecting machine based on cost. Theories: Students should explain: • Proper agricultural machinery. • Machine costing calculations. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while selecting machinery records. • Safe handling of working tools and equipment. • Waste disposal.	equipment and safety gears are to be available: • Computer with internet facility. • List of suppliers of agricultural machinery. • List of existing agricultural machinery. • Agricultural machinery catalogues. • Exhaust analyzer. • Inspection pit. • Stethoscope. • Multimeter. • Pressure testing tools. • Power testing equipment. • Price list of agricultural machinery. • Calculator. • Service manuals. • Safety gears	
		(f) Selecting machinery	Brainstorm Guide students	Students should be able to:	Selected machines	Knowledge evidence: Detailed knowledge of:	The following tools, equipment and	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
		y based on adaptability to local conditions	to define, identify different conditions and type of machine adaptable to suit local condition Practical work Guide students on how to Select machinery based on adaptability to local conditions Activity Organize students in manageable group to select machinery based on adaptability to local condition	• Select tools and equipment. • Interpret technical drawing. • Interpret proforma invoices. • Select a machine based on adaptability to local conditions • Observe safety precautions • Perform Pre-Delivery Inspection (PDI). • Select proper machines. • Clean tools, equipment and work place. • Store tools, equipment and material.	conform to technical Specifications.	Methods used: Students should explain different ways of selecting proper agricultural machinery. Principles: Students should explain the principle of: • Select machinery based on adaptability to local conditions • Theories: Students should explain: • Selection of machine based on adaptability to local conditions. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while selecting machinery records. • Safe handling of working tools and equipment. • Waste disposal.	safety gears are to be available: • Computer with internet facility. • List of suppliers of agricultural machinery. • List of existing agricultural machinery. • Agricultural machinery catalogues. • Exhaust analyzer. • Inspection pit. • Stethoscope. • Multimeter. • Pressure testing tools. • Power testing equipment. • Price list of agricultural machinery. • Calculator. • Service manuals. • Safety gears	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
		(g) Selecting machinery based on availability of dealers	Question and answer Guide students to define, identify different agricultural machinery dealers and manufacturers Practical work Guide students on how to Select machinery based on availability of dealers Activity Organize students in manageable group to Select machinery based on availability of dealers	Students should be able to: • Select tools and equipment. • Interpret technical drawing. • Interpret proforma invoices. • Select a machine based on availability of dealers. • Observe safety precautions. • Select proper machines. • Clean tools, equipment and work place. • Store tools, equipment and material.	Selected machines conform to technical Specifications.	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain different ways of selecting proper agricultural machinery. Principles: Students should explain the principle of: • Select a machine based on availability of dealers. Theories: Students should explain: • Select a machine based on availability of dealers. Circumstantial knowledge: Detailed knowledge about: • Safety precautions while selecting machinery records. • Safe handling of working tools and equipment. • Waste disposal.	The following tools, equipment and safety gears are to be available: • Computer with internet facility. • List of suppliers of agricultural machinery. • List of existing agricultural machinery. • Agricultural machinery catalogues. • Exhaust analyzer. • Inspection pit. • Stethoscope. • Multimeter. • Pressure testing tools. • Power testing equipment. • Price list of agricultural machinery. • Calculator. • Service manuals. • Safety gears	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
		(h) Selecting machinery according to availability of spares / machinery	Brainstorm Guide students to define, identify different machine spare parts availability Practical work Guide students on how to Select a machine based on availability of spares and machines. Activity Organize students in manageable group to Select a machine based on availability of spares and machines.	Students should be able to: • Select tools and equipment. • Interpret technical drawing. • Interpret proforma invoices. • Select a machine based on availability of spares and machines. • Observe safety precautions • Clean tools, equipment and work place. • Store tools, equipment and material.	Selected machines conform to technical Specifications.	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain different ways of selecting proper agricultural machinery. Principles: Students should explain the principle of: • Select a machine based on availability of spares and machines. • Theories: Students should explain: • Select a machine based on availability of spares and machines. • Circumstantial knowledge: Detailed knowledge about: • Safety precautions while selecting machinery records. • Safe handling of working tools and equipment. • Waste disposal.	The following tools, equipment and safety gears are to be available: • Computer with internet facility. • List of suppliers of agricultural machinery. • List of existing agricultural machinery. • Agricultural machinery catalogues. • Exhaust analyzer. • Inspection pit. • Stethoscope. • Multimeter. • Pressure testing tools. • Power testing equipment. • Price list of agricultural machinery. • Calculator. • Service manuals. • Safety gears.	
		(i) Performin	Brainstorm	Students should	Selected	Knowledge evidence:	The following tools,	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
		g pre-delivery inspection (PDI) of agricultural machinery.	Guide students to define, identify procedures on how to perform PDI of agricultural machinery Practical work Guide students on how to Perform pre-delivery inspection (PDI) of agricultural machinery Activity Organize students in manageable group to perform pre-delivery inspection (PDI) of agricultural machinery	be able to: • Select tools and equipment. • Interpret technical drawing. • Interpret proforma invoices. • Select a machine based on size. • Select a machine based on cost comparison • Select a machine based on availability of dealers. • Select a machine based on availability of spares and machines. • Select a	machines conform to technical Specifications.	Detailed knowledge of: Methods used: Students should explain different ways of selecting proper agricultural machinery. Principles: Students should explain the principle of: • Perform pre-delivery inspection (PDI) of agricultural machinery Theories: Students should explain: • Perform pre-delivery inspection (PDI) of agricultural machinery Circumstantial knowledge: Detailed knowledge about: • Safety precautions while selecting machinery records. • Safe handling of working tools and equipment. • Waste disposal.	equipment and safety gears are to be available: • Computer with internet facility. • List of suppliers of agricultural machinery. • List of existing agricultural machinery. • Agricultural machinery catalogues. • Exhaust analyzer. • Inspection pit. • Stethoscope. • Multimeter. • Pressure testing tools. • Power testing equipment. • Price list of agricultural machinery. • Calculator. • Service manuals. • Safety gears	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				machine based on adaptability to local conditions • Observe safety precautions. • Perform Pre-Delivery Inspection (PDI). • Select proper machines. • Clean tools, equipment and work place. • Store tools, equipment and material.				
9.0. Maintaining renewable energy sources	9.1. Performing maintenance of wind mills	(a) Checking and repairing windmill gear box.	Brainstorm Guide students to define, identify function of wind mill Practical work Guide students on how to	Students should be able to: • Interpret drawings. • Select tools and equipment. • Inspect wind mill. • Dismantle	Serviced wind mill conforms to technical Specifications.	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to service different types of wind mills. Principles: Students should explain the principle of: • Dismantle wind mills. • Servicing wind mills.	The following tools, equipment and safety gears are to be available: • Wind mill. • Multimeter. • Tool kit. • Grease gun. • Oil can. • Service manual.	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	Product/Services Assessment	Knowledge Assessment		
			check and repair windmill gear box. Activity Organize students in manageable group to check and repair windmill gear box.	- wind mill. - Identify defects. - Service wind mill. - Assemble wind mill. - Perform relevant adjustment - Observe safety precautions - Test wind mill. - Clean tools, equipment and work place. - Store tools and equipment.		- Assembling wind mills. - Alignment of wind mills. Theories: Students should: - Describe wind trapping procedures. - Explain safety precautions on servicing wind mills. - Explain pressure, force and friction. - Outline components of wind mill. - Explain functions of wind mills. Circumstantial knowledge: Detailed knowledge about: - Safety precautions to be observed while servicing wind mill. - Safe handling of working tools and equipment. - Waste disposal.	- Lifting and lowering tools. - Welding machines. - Hacksaw. - Tripod stand. - Chain block. - Drill machine. - Pipe clamp. - Bench vice. - Power supply. - Try square. - Tap and dies. - Hand grinder. - Safety gears	
		(b) Checking and replacing leather cups	Brainstorm Guide students to define, identify procedures on replacing leather cups	Students should be able to: - Interpret drawings. - Select tools and	Serviced wind mill conforms to technical Specifications.	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to Check and replace leather cups Principles: Students should	The following tools, equipment and safety gears are to be available: - Wind mill. - Multimeter.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Practical work Guide students on how to Check and replace leather cups Activity Organize students in manageable group to Check and replace leather cups	equipment. - Inspect wind mill. - Identify defects. - Check replacing leather cups - Service wind mill. - Observe safety precautions - Clean tools, equipment and work place. - Store tools and equipment.		explain the principle of: - Checking and replacing leather cups Theories: Students should: - Describe procedures for checking and replacing leather cups Circumstantial knowledge: Detailed knowledge about: - Safety precautions to be observed while servicing wind mill. - Safe handling of working tools and equipment. Waste disposal.	- Tool kit. - Grease gun. - Oil can. - Service manual. - Lifting and lowering tools. - Welding machines. - Hacksaw. - Tripod stand. - Chain block. - Drill machine. - Pipe clamp. - Bench vice. - Power supply. - Try square. - Tap and dies. - Hand grinder. - Safety gears	
		(c) Checking and replacing drive rods	Brainstorm Guide students to define, Identify procedures to Check and replace drive rods Practical work Guide students	Students should be able to: - Interpret drawings. - Select tools and equipment. - Inspect wind mill. - Identify defects.	Serviced wind mill conforms to technical Specifications.	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to check and replace drive rods Principles: Students should explain the principle of: - Check and replace drive rods Theories: Students should: - Describe how to Check	The following tools, equipment and safety gears are to be available: - Wind mill. - Multimeter. - Tool kit. - Grease gun. - Oil can. - Service manual.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			on how to Check and replace drive rods Activity Organize students in manageable group to Check and replace drive rods	• Check and replacing drive rods • Perform relevant adjustment • Observe safety precautions • Clean tools, equipment and work place. • Store tools and equipment.		and replace drive rods Circumstantial knowledge: Detailed knowledge about: • Safety precautions to be observed while servicing wind mill. • Safe handling of working tools and equipment. • Waste disposal.	• Lifting and lowering tools. • Welding machines. • Hacksaw. • Tripod stand. • Chain block. • Drill machine. • Pipe clamp. • Bench vice. • Power supply. • Try square. • Tap and dies. • Hand grinder. • Safety gears	
		(d) Performing maintenance of wind mill tower	Brainstorm Guide students to define, Identify procedures on how to perform maintenance of wind mill tower Practical work Guide students on how to perform maintenance of wind mill tower	Students should be able to: • Interpret drawings. • Select tools and equipment. • Inspect wind mill. • Identify defects. • Perform maintenance of wind mill • Perform	Serviced wind mill tower conforms to technical Specifications.	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to service different types of wind mills. Principles: Students should explain the principle of: • Performing maintenance of wind mill • Theories: Students should: • Describe procedures for performing maintenance of wind mill. Circumstantial	The following tools, equipment and safety gears are to be available: • Wind mill. • Multimeter. • Tool kit. • Grease gun. • Oil can. • Service manual. • Lifting and lowering tools. • Welding machines.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Activity Organize students in manageable group to perform maintenance of wind mill tower	relevant adjustment - Observe safety precautions - Test wind mill. - Clean tools, equipment and work place. - Store tools and equipment.		knowledge: Detailed knowledge about: - Safety precautions to be observed while maintaining wind mill. - Safe handling of working tools and equipment. - Waste disposal.	- Hacksaw. - Tripod stand. - Chain block. - Drill machine. - Pipe clamp. - Bench vice. - Power supply. - Try square. - Tap and dies. - Hand grinder. - Safety gears	
	9.2. Servicing solar energy components	(a) Servicing solar energy storage equipment	Discussion Guide students to define terms, identify function of solar energy Practical work Guide students on how to Service solar energy storage equipment Activity Organize students in manageable	Students should be able to: - Interpret drawings. - Select tools and equipment. - Inspect solar energy components. - Dismantle solar energy components. - Identify faults / defects. - Service solar energy	Serviced solar energy components conform to technical Specifications.	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to service different types of solar energy components. Principles: Students should explain the principle of: - Servicing solar energy components. Theories: Students should: - Outline different types and sizes of solar energy components. - Describe safety precautions on servicing solar energy components.	The following tools, equipment and safety gears are to be available: - Solar energy components. - Multimeter. - Hydrometer. - Funnel. - High rate discharge tester. - Tool kit. - Grease gun. - Oil can. - Service manual. - Lifting and lowering tools.	45

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			group to Service solar energy storage equipments	components. - Assemble solar energy components. - Perform relevant adjustments. - Observe safety precautions - Test solar energy components. - Clean tools, equipment and work place. - Store tools and equipment.		- Outline components of solar energy systems. - Explain functions of solar energy - Uses of solar energy. Circumstantial knowledge: Detailed knowledge about: - Safety precautions to be observed while performing service of solar energy components. - Safe handling of working tools and equipment. - Waste disposal.	- Welding machines. - Hacksaw. - Carpentry tools. - Tripod stand. - Chain block. - Drill machine. - Pipe clamp. - Bench vice. - Wheel barrow. - Try square. - Tap and dies. - Hand grinder. - Safety gears	
		(b) Servicing solar energy electrical system	Brainstorm Guide students to define terms, identify components of solar energy electrical system Practical work Guide students on how to	Students should be able to: - Interpret drawings. - Select tools and equipment. - Inspect solar energy components. - Dismantle solar energy	Serviced solar energy electrical system components conform to technical Specifications.	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to service different types of solar energy components. Principles: Students should explain the principle of: Servicing solar energy electrical system components. Theories: Students should:	The following tools, equipment and safety gears are to be available: - Solar energy system components. - Multimeter. - Ladder. - Hydrometer. - Funnel.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Service solar energy electrical system Activity Organize students in manageable group to service solar energy electrical system	electrical system components. - Identify faults / defects. - Service solar energy electrical system components - Observe safety precautions - Clean tools, equipment and work place. - Store tools and equipment.		- Explain procedures for servicing solar electrical system energy components. Circumstantial knowledge: Detailed knowledge about: - Safety precautions to be observed while performing service of solar energy components. - Safe handling of working tools and equipment. - Waste disposal.	- High rate discharge tester. - Tool kit. - Grease gun. - Oil can. - Service manual. - Lifting and lowering tools. - Welding machines. - Hacksaw. - Carpentry tools. - Tripod stand. - Chain block. - Drill machine. - Pipe clamp. - Bench vice. - Wheel barrow. - Try square. - Tap and dies. - Hand grinder. - Safety gears	
		(c) Installation of solar energy system	Brainstorm Guide students to define, Identify procedures for Installation of solar energy system	Students should be able to: - Interpret drawings. - Select tools and equipment. - Inspect solar energy	Installation of solar energy conform to technical Specifications.	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to service different types of solar energy components. Principles: Students should explain the principle of: Installing solar energy	The following tools, equipment and safety gears are to be available: - Solar energy components. - Multimeter. - Ladder. - Hydrometer.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Practical work Guide students on how to Install of solar energy system Activity Organize students in manageable group to Install solar energy system	components. - Dismantle solar energy components. - Observe safety precautions - Installing solar energy system - Clean tools, equipment and work place. - Store tools and equipment.		system Theories: Students should: - Describe safety precautions on Installing solar energy system - Explain procedures for Installing solar energy system Circumstantial knowledge: Detailed knowledge about: - Safety precautions to be observed while Installing solar energy system - Safe handling of working tools and equipment. Waste disposal.	- Funnel. - High rate discharge tester. - Tool kit. - Grease gun. - Oil can. - Service manual. - Lifting and lowering tools. - Welding machines. - Hacksaw. - Carpentry tools. - Tripod stand. - Chain block. - Drill machine. - Pipe clamp. - Bench vice. - Wheel barrow. - Try square. - Tap and dies. - Hand grinder. - Safety gears	
		(d) Constructing solar dryers	Brainstorm Guide students to define, Identify procedures on how to Construct solar dryers	Students should be able to: - Interpret drawings. - Select tools and equipment. - Construct	Constructed solar dryers conform to technical Specifications.	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to service different types of solar energy components. Principles: Students should explain the principle of:	The following tools, equipment and safety gears are to be available: - Solar energy components. - Multimeter. - Ladder.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Practical work Guide students on how to Construct solar dryers Activity Organize students in manageable group to Construct solar dryers	solar dryers - Observe safety precautions - Test solar energy components. - Clean tools, equipment and work place. - Store tools and equipment.		- Construction of solar dryers Theories: Students should: - Outline different types and sizes of solar energy components. - Describe safety precautions on constructing solar dryers. - Uses of solar dryer Circumstantial knowledge: Detailed knowledge about: - Safety precautions to be observed while Constructing solar dryers - Safe handling of working tools and equipment. - Waste disposal.	- Hydrometer. - Funnel. - High rate discharge tester. - Tool kit. - Grease gun. - Oil can. - Service manual. - Lifting and lowering tools. - Welding machines. - Hacksaw. - Carpentry tools. - Tripod stand. - Chain block. - Drill machine. - Pipe clamp. - Bench vice. - Wheel barrow. - Try square. - Tap and dies. - Hand grinder. - Safety gears	
		(e) Maintaining solar cookers	Brainstorm Guide students to define, Identify uses and features of solar cooker	Students should be able to: - Interpret drawings. - Select tools and equipment.	solar cookers Maintained conform to technical Specifications.	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to service different types of solar energy components. Principles: Students should	The following tools, equipment and safety gears are to be available: - Solar energy components. - Multimeter.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Practical work Guide students on how to Maintain solar cookers Activity Organize students in manageable group to Maintain solar cookers	• Maintain solar cooker • Observe safety precautions • Test solar energy components. • Clean tools, equipment and work place. • Store tools and equipment.		explain the principle of: • Maintaining solar cookers Theories: Students should: explain • Maintain solar cookers • Explain procedures to maintain solar cookers Circumstantial knowledge: Detailed knowledge about: • Safety precautions to be observed while performing service of solar energy components. • Safe handling of working tools and equipment. Waste disposal.	• Ladder. • Hydrometer. • Funnel. • High rate discharge tester. • Tool kit. • Grease gun. • Oil can. • Service manual. • Lifting and lowering tools. • Welding machines. • Hacksaw. • Carpentry tools. • Tripod stand. • Chain block. • Drill machine. • Pipe clamp. • Bench vice. • Wheel barrow. • Try square. • Tap and dies. • Hand grinder.	
	9.3. Constructing biogas production	(a) Servicing receiving storage tank	Brainstorm Guide students to define, Identify function of biogas	Students should be able to: • Interpret drawings. • Select tools and equipment.	Serviced receiving storage tank conforms to technical Specifications.	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to service different types of biogas plants. Principles: Students should	The following tools, equipment and safety gears are to be available: • Biogas production system.	45

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
	n system		Practical work Guide students on how to Service receiving storage tank Activity Organize students in manageable group to Service receiving storage tank	- Inspect biogas plant. - Service receiving storage tank - Observe safety precautions - Clean tools, equipment and work place. - Store tools and equipment.		explain the principle of: - Service receiving storage tank - Fluid mechanics. Theories: Students should: - Describe procedure of Service receiving storage tank - Explain safety precautions on servicing biogas plant. - Outline gas properties. - Outline biogas plant components. - Explain functions of different biogas components. - Outline different uses of biogas. Circumstantial knowledge: Detailed knowledge about: - Safety precautions to be observed while servicing receiving storage tank. - Safe handling of working tools and equipment. - Waste disposal.	- Flow meter. - Temperature gauge. - Volume gauge. - Welding machine. - Tool kit. - Service manual. - Grease gun. - Drill machine. - Pipe clamp. - Bench vice. - Tap and dies. - Hand grinder. - Safety gears	
		(b) Servicing biogas	Brainstorm Guide students	Students should be able to:	Serviced biogas	Knowledge evidence: Detailed knowledge of:	The following tools, equipment and	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
		reactors	to define, Identify function of biogas reactors Practical work Guide students on how to Service biogas reactors Activity: Organize students in manageable group to Service biogas reactors	• Interpret drawings. • Select tools and equipment. • Inspect biogas reactors • Service biogas reactors • Observe safety precautions • Clean tools, equipment and work place. • Store tools and equipment.	plant conforms to technical Specifications.	Methods used: Students should explain how to service different types of biogas plants. Principles: Students should explain the principle of: • Service biogas reactors Theories: Students should: • Describe procedure of Servicing biogas reactors Circumstantial knowledge: Detailed knowledge about: • Safety precautions to be observed while servicing biogas reactors. • Safe handling of working tools and equipment. Waste disposal.	safety gears are to be available: • Biogas production system. • Flow meter. • Temperature gauge. • Volume gauge. • Welding machine. • Tool kit. • Service manual. • Grease gun. • Drill machine. • Pipe clamp. • Bench vice. • Tap and dies. • Hand grinder. • Safety gears	
		(c) Servicing biogas stove	Discussion Guide students to define, Identify procedures for servicing biogas stove Practical work Guide students	Students should be able to: • Interpret drawings. • Select tools and equipment. • Inspect biogas plant. • Identify	Serviced biogas plant conforms to technical Specifications.	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to service different types of biogas plants. Principles: Students should explain the principle of: • Servicing biogas plant. • Biogas plant	The following tools, equipment and safety gears are to be available: • Biogas production system. • Flow meter. • Temperature gauge.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			on how to Service biogas stove Activity Organize students in manageable group to Service biogas stove	defects. • Service biogas plant. • Perform relevant adjustments. • Observe safety precautions • Test biogas plant. • Clean tools, equipment and work place. • Store tools and equipment.		construction. • Fluid mechanics. Theories: Students should: • Describe procedure of Servicing biogas stove Circumstantial knowledge: Detailed knowledge about: • Safety precautions to be observed while servicing biogas stove. • Safe handling of working tools and equipment. • Waste disposal.	• Volume gauge. • Welding machine. • Tool kit. • Service manual. • Grease gun. • Drill machine. • Pipe clamp. • Bench vice. • Tap and dies. • Hand grinder. • Safety gears	
		(d) Servicing biogas electricity components.	Question and answer Guide students to define, Identify features of biogas electricity components. Practical work Guide students on how to Service biogas	Students should be able to: • Interpret drawings. • Select tools and equipment. • Inspect biogas electricity components. • Identify defects. • Service	Serviced biogas plant conforms to technical Specifications.	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to service different types of biogas plants. Principles: Students should explain the principle of: • Servicing biogas plant. • Biogas plant construction. • Fluid mechanics. Theories: Students should: • Describe procedure of	The following tools, equipment and safety gears are to be available: • Biogas production system. • Flow meter. • Temperature gauge. • Volume gauge. • Welding machine.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			electricity components. Activity Organize students in manageable group to Service biogas electricity components.	biogas electricity components. • Observe safety precautions • Clean tools, equipment and work place. • Store tools and equipment.		Service biogas electricity components. Circumstantial knowledge: Detailed knowledge about: • Safety precautions to be observed while servicing biogas electricity components. • Safe handling of working tools and equipment. • Waste disposal.	• Tool kit. • Service manual. • Grease gun. • Drill machine. • Pipe clamp. • Bench vice. • Tap and dies. • Hand grinder. • Safety gears	
		(e) Constructing of biogas system	Brainstorm Guide students to define, Identify procedures for constructing biogas Practical work Guide students on how to construct biogas system Activity Organize students in manageable	Students should be able to: • Interpret drawings. • Select tools and equipment. • construct biogas • Observe safety precautions • Test biogas plant. • Clean tools, equipment and work place.	biogas plant constructed conforms to technical Specifications.	Knowledge evidence: Detailed knowledge of: Methods used: Students should explain how to service different types of biogas plants. Principles: Students should explain the principle of: • Biogas plant construction. • Fluid mechanics. Theories: Students should: • Describe procedure of biogas plant construction. Circumstantial knowledge: Detailed knowledge	The following tools, equipment and safety gears are to be available: • Biogas production system. • Flow meter. • Temperature gauge. • Volume gauge. • Welding machine. • Tool kit. • Service manual. • Grease gun. • Drill machine.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			group to construct biogas plant	Store tools and equipment.		about: - Safety precautions to be observed while constructing biogas plant. - Safe handling of working tools and equipment. - Waste disposal.	- Pipe clamp. - Bench vice. - Tap and dies. - Hand grinder. - Safety gears	
10.0. Managing agro mechanics workshop	10.1. Design farm workshop layout	(a) Outline workshop service bay	Brainstorm Guide students to define, Identify workshop service bay Practical work Guide students on how to design workshop layout Activity Organize students in manageable group to outline workshop service bay	Students should be able to: - Arrange tools. - Outline workshop service bay - Design and implement safety system to workers. - Identify marks and postures. - Place sign mark and postures. - Label safety precautions for workshop materials	Workshop service bay outlined conforms to environmental and labor rules and Regulations.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Apply safety precautions Principles: Students should explain the principle of: - Laying out workshop. - Machine installation in workshop. Theories: Students should explain: - Components applied in workshop safety and security systems. Circumstantial knowledge: Detailed knowledge about: - Safe handling of working tools and equipment.	The following tools, equipment and safety gears are to be available: - Organization structures. - Different workshop layouts. - Overhead projector. - Computer. - Flip charts. - Chalk board. - Workshop with various sections. - Different management text books. - Handouts. - Stationery. - Drawing	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	Product/Services Assessment	Knowledge Assessment		
				and goods.			instruments. • Safety gears	
		(b) Designing layout of light duty equipment	Brainstorm Guide students to define, Identify types of workshop layout Practical work Guide students on how to design layout of light duty equipment Activity Organize students in manageable group to design layout of light duty equipment	Students should be able to: - Plan workshop layout. - Arrange tools. - Design security system of tools and equipment. - Design and implement safety system to workers. - Identify marks and postures. - Place sign mark and postures. - Label safety precautions for workshop materials and goods.	Designed workshop layout conforms to environmental and labor rules and Regulations.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: - Arrange different workshop sections. Principles: Students should explain the principle of: - Laying out workshop. Theories: Students should explain: - Steps to design workshop layout. Circumstantial knowledge: Detailed knowledge about: - Safe handling of working tools and equipment. Environmental impacts.	The following tools, equipment and safety gears are to be available: - Organization structures. - Different workshop layouts. - Overhead projector. - Computer. - Flip charts. - Chalk board. - Workshop with various sections. - Different management text books. - Handouts. - Stationery. - Drawing instruments - Safety gears	
		(c) Designing	Brainstorm	Students should	Designed	Knowledge evidence:	The following tools,	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
		layout of heavy-duty equipment	Guide students to define, Identify features of workshop layout for heavy duty equipment Practical work Guide students on how to design of workshop layout for heavy duty equipment Activity Organize students in manageable group to design layout of heavy-duty equipment	be able to: - Plan workshop layout heavy-duty equipment. - Arrange tools. - Design security system of tools and equipment. - Design layout of heavy-duty equipment - Design and implement safety system to workers. - Identify marks and postures. - Place sign mark and postures. - Label safety precautions for workshop	workshop layout heavy-duty equipment conforms to environmental and labor rules and Regulations.	Detailed knowledge of: Method used: Students should explain how to: - Arrange different workshop sections for heavy-duty equipment. Principles: Students should explain the principle of: - Laying out workshop. - Machine installation in workshop. Theories: Students should explain: - Steps to design workshop layout for heavy duty equipment. Circumstantial knowledge: Detailed knowledge about: - Safe handling of working tools and equipment. - Environmental impacts.	equipment and safety gears are to be available: - Organization structures. - Different workshop layouts. - Overhead projector. - Computer. - Flip charts. - Chalk board. - Workshop with various sections. - Different management text books. - Handouts. - Stationery. - Drawing instruments - Safety gears	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				materials and goods.				
	10.2. Control agricultural tools and equipment	(a) Maintaining tools control system	Brainstorm Guide students to define, Identify importance of maintaining tools Practical work Guide students on how to maintain tools control system Activity Organize students in manageable group to maintain tools control system	Students should be able to: • Design tools storage system. • Maintain tools control system • Keep record of tools and equipment in workshop. • Record damaged tools and equipment. •	Tools and equipment controlled as per Stores and financial Regulations .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Maintain tool ledgers. • Conduct stock taking. Principles: Students should explain the principles involved in controlling agricultural tools and equipment in the farm workshop. Theories: Students should explain: • Properties of tools and equipment. • Effects of weather on different tools. • Necessary security on stores/workshops. Circumstantial knowledge: Detailed knowledge about: • Safety precautions involved in performing this task. • Safe handling of tools and equipment.	The following tools, equipment and safety gears are to be available: • Skills logbook. • Tools and equipment catalogue. • Stationeries. • Scientific calculator. • Staple machine. • Safety gears • Binding machine. • Tools list. • Bench with tool crip. • Toolboxes. • Tools issue voucher. • Tools ledger. • Equipment ledger. • Tools inventory list. • Files.	8
		(b) Taking	Brainstorm	Students should	Tools and	Knowledge evidence:	The following tools,	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
		inventory of tools and equipment .	Guide students to define, Identify importance of taking inventory of tools and equipment. Practical work Guide students on how to take inventory of tools and equipment. Activity Organize students in manageable group to take inventory of tools and equipment.	be able to: • Design tools storage system. • Take inventory of tools and equipment. • Record tools and equipment issued daily from stores. • Record tools and equipment received daily from user. • Record damaged tools and equipment. • Record lost equipment and tools. • Discard damaged tools and equipment. • Order new tools and	equipment controlled as per stores and financial Regulations.	Detailed knowledge of: Method used: Students should explain how to: • Maintain tools inventory record • Take inventory of tools and equipment. Principles: Students should explain the principles involved in controlling agricultural tools and equipment in the farm workshop. Theories: Students should explain: • Properties of tools and equipment. • Effects of weather on different tools. • Necessary security on stores/workshops. Circumstantial knowledge: Detailed knowledge about: • Safety precautions involved in performing this task. • Safe handling of tools and equipment.	equipment and safety gears are to be available: • Skills logbook. • Tools and equipment catalogue. • Stationeries. • Scientific calculator. • Staple machine. • Safety gears • Binding machine. • Tools list. • Walldrobe. • Bench with tool crip. • Toolboxes. • Tools issue voucher. • Tools ledger. • Equipment ledger. • Tools inventory list. • Files.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				equipment.				
	10.3. Estimating material and labour cost	(a) Maintaining records of workshop materials	Brainstorm Guide students to define, Identify importance of estimating material and labour cost Practical work Guide students on how Maintain records of workshop materials Activity Organize students in manageable group to Maintain records of workshop materials	Students should be able to: • Maintain records of workshop materials • Prepare material request. • Clean the tools and equipment. • Store tools, equipment and other materials.	Maintained records of workshop materials as per task to be Performed.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Maintain records of workshop materials Principles: Students should explain the principles of Maintain records of workshop materials. Theories: Students should explain: • Maintaining records of workshop materials Circumstantial knowledge: Detailed knowledge about: • Safety precautions involved in performing the task. • Safe handling of materials and documents.	The following tools, equipment and safety gears are to be available: • List of spares and material. • Prepared materials. • Local purchases order (LPO). • Calculator/Computer. • Stationeries. • Overcoat. • Safety boot. • Binding machine. • Material requisition form (Material requisition voucher form (MVR)). • Job card. • Price list. • Mask. • Good receive note (GRN). • Gloves.	9
		(b) Maintaining	Brainstorm:	Students should	Maintain	Knowledge evidence:	The following tools,	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
		g man hours and day of workshop staff	Guide students to define, Identify importance of time management of workshop staff Practical work Guide students on how to handle tools, equipment and machines safely Activity Organize students in manageable group to identify mechanical hazard in school premises	be able to: • Maintain man hours and day of workshop • Clean the tools and equipment. • Store tools, equipment and other materials.	man hours and day of workshop labour Cost estimates of materials and labour prepared	Detailed knowledge of: Method used: Students should explain how to: • Interpret inspection report. • Calculate the costs of identified materials and labour. Principles: Students should explain the principles of determine man-hour rate to make labour cost estimates. Theories: Students should explain: • Importance of estimating materials and labour cost. • Importance of using genuine materials. • Use of parts catalogue. Circumstantial knowledge: Detailed knowledge about: • Safety precautions involved in performing the task. Safe handling of materials and documents.	equipment and safety gears are to be available: • List of spares and material. • Prepared materials. • Local purchases order (LPO). • Calculator/Computer. • Stationeries. • Overcoat. • Safety boot. • Binding machine. • Material requisition form (Material requisition voucher form (MVR)). • Job card. • Price list. • Mask. • Good receive note (GRN). • Gloves.	
		(c) Performing job cost	Brainstorm Guide students	Students should be able to:	Cost estimates of	Knowledge evidence: Detailed knowledge of:	The following tools, equipment and	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
		calculations.	to define, Identify procedures for performing job Practical work Guide students on how to Perform job cost calculations. Activity Organize students in manageable group to Perform job cost calculations.	- Read inspection report. - Prepare material cost estimates. - Prepare overhead costs - Prepare material request. - Obtain proforma invoice from different shops. - Prepare labour cost including other overheads. - Clean the tools and equipment. - Store tools, equipment and other materials.	materials and labour prepared as per task to be Performed.	Method used: Students should explain how to: - Interpret inspection report. - Calculate the costs of identified materials and labour. Principles: Students should explain the principles of determine man-hour rate to make labour cost estimates. Theories: Students should explain: - Importance of estimating materials and labour cost. Circumstantial knowledge: Detailed knowledge about: - Safety precautions involved in performing the tasks - Safe handling of materials and documents.	safety gears are to be available: - List of spares and material. - Prepared materials. - Local purchases order (LPO). - Calculator/Computer. - Stationeries. - Overcoat. - Safety boot. - Binding machine. - Material requisition form (Material requisition voucher form (MVR)). - Job card. - Price list. - Mask. - Good receive note (GRN). - Gloves.	
	10.4. Train sub-ordi	(a) Preparing training needs	Brainstorm Guide students to define,	Students should be able to: Select tools	A training program	Knowledge evidence: Detailed knowledge of: Method used: Students	The following tools, equipment and safety gears are to	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	Product/Services Assessment	Knowledge Assessment		
	nates on the job		Identify training needs assessment Practical work Guide students on how to Prepare training needs Activity Organize students in manageable group to Prepare training needs	and equipment. • Prepare capability chart of the subordinates . • Conduct training needs assessment • Identify knowledge and skills to be imparted. • Identify previous knowledge and skills possessed by the person to be trained. • Carryout the training programme by using four steps plan (prepare, present, try-out, assign work).	prepare d to meet job requirements. A person trained is able to execute tasks to required standards according to regulations.	should explain how to prepare training programme. Principles: Students should explain the principles of carrying out training programme by using the four steps plan (prepare, present, try-out assign work). Theories: Students should explain: • 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. Circumstantial knowledge: Detailed knowledge about: Basic principles of educational psychology.	be available: • Workshop. • Tool box. • Tools. • Multimeter. • Workshop machines i.e. - Grinding machine. - Drilling machine. - Valve grinder. - Drum and disc service machine. - Wheel balancing machine. - Wheel alignment machine/gauge. - Head light aiming machine. - Testing benches. - Bench vices. - Anvil. - Hydraulic	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				- Continually assess progress of workers. - Make necessary adjustments to the training programme schedule. - Clean the work area. - Store tools, equipment, safety gears and other items.			press. - Surface block. - First aid kit. - Firefighting equipment. - Emergency exit. - Overhead projector. - Computer. - TV. - Organization structure	
		(b) Carrying out training of sub-ordinates.	Brainstorm Guide students to define, Identify importance of Carry out training of sub-ordinates. Practical work Guide students on how to carry out training of sub-ordinates.	Students should be able to: - Select tools and equipment. - Carry out training of sub-ordinates - Identify knowledge and skills to be imparted - Clean the	A training program prepared to meet job requirements . A person trained is able to execute tasks to required standards according to	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to prepare training programme. Principles: Students should explain the principles of carrying out training programme by using the four steps plan (prepare, present, try-out assign work). Theories: Students should explain: The importance of step	The following tools, equipment and safety gears are to be available: - Workshop. - Tool box. - Tools. - Multimeter. - Workshop machines i.e. - Grinding machine. - Drilling machine.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Activity Organize students in manageable group to Carry out training of sub-ordinates.	work area. Store tools, equipment, safety gears and other items.	regulations.	by step guidance from simple to complex tasks. Advise farmer on proper usage of agricultural machinery Circumstantial knowledge: Detailed knowledge about: Basic principles of educational psychology.	- Valve grinder. - Drum and disc service machine. - Wheel balancing machine. - Wheel alignment machine/gauge. - Head light aiming machine. - Testing benches. - Bench vices. - Anvil. - Hydraulic press. • Surface block. • First aid kit. • Firefighting equipment. • Emergency exit. • Overhead projector. • Computer. • TV. • Organization	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
							structure	
		(c) Advise farmer on proper usage of agricultural machinery .	Brainstorm Guide students to define, Identify importance proper usage of agricultural machinery Practical work Guide students on how to advise farmer on proper usage of agricultural machinery Activity Organize students in manageable group to advise farmer on proper usage of agricultural machinery	Students should be able to: • Select tools and equipment. • Advise farmer on proper usage of agricultural machinery assessment • Clean the work area. • Store tools, equipment, safety gears and other items.	A training program 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: Students should explain how to prepare training programme. Principles: Students should explain the principles of carrying out training programme by using the four steps plan (prepare, present, try-out assign work). Theories: Students should: • Explain ways on proper usage of agricultural machinery Circumstantial knowledge: Detailed knowledge about: Basic principles of educational psychology.	The following tools, equipment and safety gears are to be available: • Workshop. • Tool box. • Tools. • Multimeter. • Workshop machines i.e. • Grinding machine. • Drilling machine. • Valve grinder. • Drum and disc service machine. • Wheel balancing machine. • Wheel alignment machine/gauge. • Head light aiming machine. • Testing benches. • Bench vices. • Anvil. • Hydraulic press. • Surface block. • First aid kit. • Firefighting equipment.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
							- Emergency exit. - Overhead projector. - Computer. - TV. - Organization structure	
	10.5. Prepare reports	(a) Collecting information	Brainstorm Guide students to define terms, identify importance of collecting information Practical work Guide students on how to Collect information Activity Organize students in manageable group to Collect information	Students should be able to: - Collect information. - Write technical reports. - Prepare action plan. - Keep records.	The collected information contain required contents as per management requirements .	Knowledge evidence: Detailed knowledge of: Method used: Students should explain: - Procedures for Collecting information for report preparation Principles: Students should explain the principle of: - Supervision. - Reporting. Theories: Students should explain: - Importance of reports. - Contents of reports. - Writing of technical report. Circumstantial knowledge: Detailed knowledge about report writing.	The following tools, equipment and safety gears are to be available: - Office/table and chairs. - Stationery. - Computer. - Job card. - Subordinates reports. - Binding machine. - Photocopy machine. - Overcoat. - Safety boots.	10
		(b) Submit technical report	Brainstorm Guide students to define,	Students should be able to: Collect	The submitted reports	Knowledge evidence: Detailed knowledge of: Method used: Students	The following tools, equipment and safety gears are to	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			Identify procedure on how to Submit technical report Practical work Guide students on how to Submit technical report Activity Organize students in manageable group to Submit technical report	information • Write technical reports. • Prepare budget report. • Prepare action plan. • Keep records.	contain required contents as per management requirements .	should explain: • Submission of technical reports. Principles: Students should explain the principle of: • Supervision. • Reporting. Theories: Students should explain: • Writing of technical report. Circumstantial knowledge: Detailed knowledge about report writing.	be available: • Office/table and chairs. • Stationery. • Computer. • Job card. • Subordinates reports. • Binding machine. • Photocopy machine. • Overcoat. • Safety boots.	
	10.6. Manage agricultural workshop business	(a) Performing entrepreneurial tactics.	Brainstorm Guide students to define, identify opportunities of performing entrepreneurial tactics in school premises Practical work Guide students on how to Perform entrepreneurial	Students should be able to: • Calculate total project cost. • Prepare project write up/business plan. • Select appropriate site for establishing workshop. • Acquire	Managed workshop business entrepreneurial tactics conforms to stipulated Regulations	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Establish and run workshop business. • Analyze profit and loss. Principles: Students should explain principles used to: • Acquire capital from the Bank or an NGO. • Calculate business profit and loss. • Manage private business workshop.	The following tools, equipment and safety gears are to be available: • Farm workshop layout chart. • Business films/video cassettes. • Business magazines. • Workshop business regulations. • Scheduled	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	Product/Services Assessment	Knowledge Assessment		
			tactics Activity Organize students in manageable group to perform entrepreneurial tactics	land/building for setting the workshop. • Purchase basic hand tools and equipment. • Supervise provision of payment invoices and receipts. • Identify labour and overhead costs. • Analyze profit and loss.		• Manage non private business workshop. Theories: Students should explain: • Meaning of “business”. • Meaning of workshop. • Project write up procedures. • Good customer care. Circumstantial knowledge: Detailed knowledge about: • Conduct manpower planning • Safe handling of business capital.	maintenance of machines. • Job card sheets. • Stationeries. • Receipt book. • Invoice books. • Safety gears. • Workshop tools and equipment. • Personal computer. • Workshop store. • Workshop office. • Tool ledger book.	
		(b) Conducting manpower planning	Brainstorm Guide students to define terms, identify importance of Conducting manpower planning Practical work Guide students	Students should be able to: • Perform manpower planning. • Prepare at least six months’ salary for potential workers.	Managed workshop business conforms to stipulated Regulations.	Knowledge evidence: Detailed knowledge of: Method used: Students should explain how to: • Analyze profit and loss. Principles: Students should explain principles used to: • Conduct manpower planning Theories: Students should explain:	The following tools, equipment and safety gears are to be available: • Farm workshop layout chart. • Business films/video cassettes. • Business	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			on how to Conduct manpower planning Activity Organize students in manageable group to Conduct manpower planning	- Exercise good customer care. - Supervise provision of payment invoices and receipts. - Identify labour and overhead costs. - Analyze profit and loss		- Good customer care. Circumstantial knowledge: Detailed knowledge about: - Marketing and use of mass media. - Safe handling of business capital.	magazines. - Workshop business regulations. - Scheduled maintenance of machines. - Job card sheets. - Stationeries. - Receipt book. - Invoice books. - Safety gears. - Workshop tools and equipment. - Personal computer. - Workshop store. - Workshop office. - Tool ledger book.	
		(c) Supervise junior workers	Brainstorm Guide students to describe concept of supervising junior workers Practical work Guide students on how to supervise junior	Students should be able to: - 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: Students should explain how to: - Establish and run workshop business. - Analyze profit and loss. Principles: Students should explain principles used to: - Acquire capital from the Bank or an NGO.	The following tools, equipment and safety gears are to be available: - Farm workshop layout chart. - Business films/video cassettes. - Business magazines.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
			workers Activity Organize students in manageable group to practice on how to supervise junior workers	establishing workshop. - Acquire land/building for setting the workshop. - Purchase basic hand tools and equipment. - Perform manpower planning. - Prepare at least six months' salary for potential workers. - Exercise good customer care. - Supervise provision of payment invoices and receipts. - Identify labour and overhead		- Calculate business profit and loss. - Manage private business workshop. - Manage non private business workshop. Theories: Students should explain: - Meaning of "business". - Meaning of workshop. - Project write up procedures. - Good customer care. Circumstantial knowledge: Detailed knowledge about: - Marketing and use of mass media. - Safe handling of business capital.	- Workshop business regulations. - Scheduled maintenance of machines. - Job card sheets. - Stationeries. - Receipt book. - Invoice books. - Safety gears. - Workshop tools and equipment. - Personal computer. - Workshop store. - Workshop office. - Tool ledger book.	

Module Title (Main Competence)	Unit Title (Specific Competences)	Elements (Learning Activities)	Suggested Teaching and Learning Methods	Assessment Criteria			Training Requirements/ Suggested Resources	Number of Periods per Unit
				Process Assessment	Product/Services Assessment	Knowledge Assessment		
				costs. • Analyse profit and loss.				
11.0. Project								150

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