

**THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF EDUCATION AND VOCATIONAL TRAINING**



**AGRICULTURE SYLLABUS FOR ADVANCED
SECONDARY EDUCATION
FORM V - VI**

2010

5723
Tiel 6352

THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF EDUCATION AND VOCATIONAL TRAINING



AGRICULTURE SYLLABUS FOR ADVANCED LEVEL
SECONDARY EDUCATION

FORM V - VI

2010



© Ministry of Education and Vocational Training, 2009

ISBN: 978-9976-61-255-4

First Edition: 2009

Second Edition: 2010

Designed and prepared by:

Tanzania Institute of Education

P.O. Box 35094

Dar es Salaam

Tanzania

Tel: +255 222 2773005

Fax: +255 22 2774420

Website: www.tie.go.tz

E-mail: director.tie@tie.go.tz

All rights reserved. No part of this publication may be reproduced, reported, stored in any retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise without the permission of the copyright owner.

TABLE OF CONTENTS

	Page
1.0 Introduction	iv
2.0 The aims and objectives of education in Tanzania	v
3.0 The aims and objectives of secondary education in Tanzania	vi
4.0 General competences	vi
5.0 General objectives	vi
6.0 Organization of the syllabus	vii
7.0 Instructional time	viii
8.0 Assessment of the subject	viii
Form Five	1
Form Six	16

1.0 Introduction

1.1 Background information

This revised Agriculture syllabus for form V – VI replaces the 1984 edition. The revision process has observed the change in paradigm from that of content based to a competence based curriculum. The teaching and learning processes using this revised syllabus should be student centred and activity oriented, thereby enhancing meaningful learning. The specific objectives, teaching and learning strategies have been designed to give students more opportunity to acquire skills, strengthen their knowledge and change in attitude. They also give the students the opportunity to broaden their scope for future career development including self employment.

1.2 Subject description

Agriculture is broad and has many areas of interest. In the further education and training band, this subject covers a broad spectrum of agricultural issues, many of which develop into specialized programmes in the higher education band.

This syllabus embraces five main themes, namely:

- Agricultural Engineering and Land Planning
- Livestock Science and Production
- Crop Science and Production
- Agricultural Economics
- Soil Science

The knowledge, skills, attitudes and values acquired in this subject enables learners to understand the production and processing of food and fibre, and the caring for crops and animals. It also enables them to develop social and personal skills in the management of agriculture, so as to ensure the creation of the correct environment for sustainable agriculture.

1.3 The rationale for the review of A-Level Agriculture syllabus

The revised A-Level Agriculture syllabus has incorporated changes in order to address the current economic, environmental and technological challenges. Apart from continuing to provide the students with a sound foundation for specialized training, the syllabus wishes to prepare the students for a career in Agriculture. It will also serve several important functions as follows:

- (a) Inculcating the knowledge, skills and attitudinal changes required for solving agricultural related problems so as to cope with new market demand in the agricultural sector.

- (b) Providing appropriate foundation of the skills to be acquired at the tertiary level in the country and outside the country.
- (c) Enabling students to develop a positive attitude towards Agriculture and its role in enhancing self employment.
- (d) Broadening the understanding of new developments in the field of agriculture bearing in mind new technological advancements e.g. genetically modified organisms and organic farming.
- (e) Enabling the students to face the challenges of cross cutting issues in force and equip them with important strategies to mitigate, cope and solve the associated problems.
- (f) Trimming the previous syllabus so that students get a better opportunity to acquire relevant knowledge, skills and practical experiences.

2.0 The Aims and objectives of Education in Tanzania

1. To guide and promote the development and improvement of the personalities of the citizens of Tanzania, their human resources and effective utilization of those resources in bringing about individual and national development.
2. To promote the acquisition and appropriate use of literary, social scientific, vocational, technological, professional and other forms of knowledge, skills and understanding for the development and improvement of the condition of man and society.
3. To develop and promote self-confidence and an inquiring mind, an understanding and respect for human dignity and human rights and a readiness to work hard for personal self advancement and national improvement.
4. To enable and to expand the scope of acquisition, improvement and upgrading of mental, practical, productive and other life skills needed to meet the changing needs of industry and the economy.
5. To enable every citizen to understand the fundamentals of the National constitution as well as the enshrined human and civic rights, obligations and responsibilities.
6. To promote the love and respect for work, self and wage employment and improved performance in the production and service sectors.
7. To inculcate principles of the national ethics and integrity, national and international cooperation, peace and justice through the study, understanding and adherence to the provisions of the National constitution and other international basic charters.
8. To enable a rational use management and conservation of the environment.

3.0 The aims and objectives of secondary education in Tanzania

1. To consolidate and broaden the scope of baseline ideas, knowledge, skills and principles acquired and developed at the primary education level.
2. To enhance further development and appreciation of national unity, identify and ethic, personal integrity, respect for and readiness to work, human rights, cultural and moral values, customs, traditions and civic responsibilities and obligations.
3. To promote the development of competency in linguistic ability and effective use of communication skills in Kiswahili and in at least one foreign language.
4. To provide opportunities for the acquisition of knowledge, skills, attitudes and understanding in prescribed or selected fields of study.
5. To prepare students for tertiary and higher education vocational, technical and professional training.
6. To inculcate a sense and ability for self-study, self-confidence and self advancement in new frontiers of science and technology, academic and occupational knowledge and skills.
7. To prepare the student to join the world of work.

4.0 General Competences of "A" Level Agriculture

General competences are expressions that describe what an advanced level secondary school student will do as a result of learning this subject.

At the end of the two year course the student should have the ability to:

1. practice and advise on agricultural related issues
2. identify and solve agricultural problems and make decisions through critical and creative thinking
3. use the appropriate ICT tools to acquire, disseminate and practice agricultural activities
4. use the acquired knowledge in agricultural sciences and technology effectively and critically showing responsibility towards the environment and the health of others
5. collect, analyze, interpret and evaluate agricultural numerical information
6. develop a positive attitude that agriculture is a self employment occupation; and
7. demonstrate awareness of global threats such as HIV/AIDS, global warming and pollution

5.0 General Objectives of "A" Level Agriculture

At the end of the two year course the student should be able to:

1. grasp agricultural knowledge, skills and attitudes both theoretically and practically
2. identify and critically think on how to solve agricultural related problems

3. appreciate ICT tools and their application in agricultural based activities
4. understand and be aware of the global threats which have an impact on agricultural practices such as HIV/AIDS, global warming and pollution
5. comprehend basic communication skills in agriculture
6. be familiar with relevant developments in agricultural technology; and
7. use the knowledge, skills and attitude acquired to create self employment opportunities in various agricultural sectors

6.0 Organization of the Syllabus

This syllabus is organized into two main parts, the first part is the introductory part and the second part presented in a tabular form carries the enhanced scope and sequence chart. The table bears columns with the following sub headings: Level competences, Level objectives, Topics/subtopics, Specific objectives, Teaching/learning strategies, Teaching/learning resources, Assessment and Estimated number of periods.

6.1 Class Level competences

The competences for form five and six are stated.

6.2 Class Level objectives

The objectives of A Level Agriculture are stated.

6.3 Content matrix

This has six columns bearing six subheadings.

6.3.1 Topics/subtopics

This column contains the main topics and subtopics for Form Five and Six.

6.3.2 Specific Objectives

For each subtopic specific objectives are stated. These help the teacher to understand the depth of coverage for the subtopic. These form the basis of detailed and more focussed instruction to suit differences in the implementation contexts.

6.3.3 Teaching/Learning Strategies

These are proposed teaching and learning strategies to help the teacher implement the syllabus. These however should not limit innovative teachers from looking for alternative strategies.

6.3.4 Teaching/Learning Resources

As indicated above teachers are advised to select resources which complement their strategies. Under different circumstances, the teacher is also advised to use other relevant and more contextualized resources.

6.3.5 Assessment

The assessment column recommends procedures for formative assessment of the different types of objectives. Summative assessment procedures shall be communicated to schools by NECTA.

6.3.6 Estimated number of periods

The number of periods has been suggested per sub topic taking into consideration the length of the sub topic to be taught. Teachers are advised to strictly adhere to the framework of the allocated time so that teaching does not lag behind. Lost instructional time should always be compensated.

7.0 Instructional time

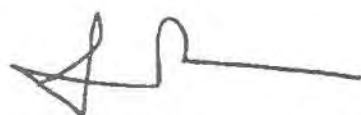
This syllabus is to be covered in 2 academic years having approximately 194 instructional days per year with two weeks reserved for mid year and annual examinations. The number of periods for teaching this syllabus is 10 periods (of 40 minutes each) per week. The teacher is advised to make maximum use of the time allocated for classroom interaction. Lost instructional time should always be compensated for.

8.0 Assessment of students in Agriculture

The table below shows the type of assessment and the accompanied assessment measures to be used. The assessment measures listed in the table contribute to continuous and final assessment of the student achievement. The frequency for each measure has indicated with the weight in %. You are therefore strongly advised to apply a wide selection of assessment measures in order to develop students' ability for the mastery of the subject matter during the teaching and learning process.

Table of the assessment for Agriculture

Type of Assessment	Assessment Measure	Frequency				Weight (%)	Total (%)
		Form V		Form VI			
		Term I	Term 2	Term 1	Term 2		
1.Continuous assessment	1. Tests	2	2	2	-	10	50
	2. Practical Tests	1	1	1	-	10	
	3. Individual assignments	1	1	1	-	5	
	4. Field works	-	1	1	-	5	
	5. Project	-	1	1	-	5	
	6. Terminal examination	1	1	1	-	15	
2.Final examination		-	-	-	1	50	50
TOTAL MARKS							100



Acting Commissioner for Education
Ministry of Education and Vocational Training
P.O. Box 9121
Dar es Salaam
Website: www.moe.go.tz
Tel: 2110150-2, 2110179
Fax: 022113271

FORM FIVE

CLASS COMPETENCES

By the end of form five the student should have the ability to:

1. demonstrate basic knowledge and skills in doing agricultural practical activities
2. apply ICT tools in learning agriculture
3. communicate effectively the agricultural knowledge, concepts, principles and skills in writing as well as orally in every day life
4. collect, analyze, interpret and evaluate agricultural numerical information
5. develop a positive attitude that agriculture is a self employment enterprise; and
6. identify and solve agricultural problems and make decisions through critical and creative thinking

CLASS OBJECTIVES

By the end of form five the student should be able to:

1. acquire basic theoretical and practical knowledge and skills in agriculture
2. understand and apply ICT tools in agricultural practices
3. possess basic communication skills in agriculture
4. develop skills for data collection, organization, analysis and interpretation of agricultural based activities
5. appreciate that agriculture is a self employing enterprise; and
6. develop awareness of global threats that have an impact on agriculture such as HIV/AIDS and environmental degradation.

TOPIC/SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEARNING STRATEGIES	TEACHING/LEARNING RESOURCES	ASSESSMENT	ESTIMATED NUMBER OF PERIODS
1.0 FARM POWER 1.1 Sources of Farm Power	By the end of this sub-topic the student should be able to:- (a) state the meaning of farm power (b) identify various sources of farm power. (c) describe the uses of farm power (d) recommend the appropriate application of farm power with particular emphasis to their relative costs and suitability	(i) Through question and answer sessions the teacher to guide students to state the meaning of farm power. (ii) The teacher to summarize students' deliberations on flip charts or manila sheets and give concluding remarks on the meaning of farm power. (i) Students to brainstorm on various sources of farm power. (ii) Site visits to observe and identify various sources of farm power. (iii) Students to observe video programmes showing various sources of farm power and prepare brief reports. (i) The teacher to guide students in groups to observe pre-drawn diagrams/pictures so that they can appreciate how various sources of farm power are used (ii) The teacher to arrange farm visits so that students can observe how various sources of farm power are used. (i) The teacher to guide students in groups to discuss the appropriate application of various sources of farm power (ii) The teacher to guide students to summarize group resolutions on flip charts (iii) The teacher to guide presentations on recommended applications of various sources of farm power.	<ul style="list-style-type: none"> • Flip charts • manila sheets • marker pen • masking tapes • pictures <ul style="list-style-type: none"> • Pre-drawn diagrams • picture • real objects <ul style="list-style-type: none"> • Pre-drawn diagrams • pictures (slides/video) • real objects • models <ul style="list-style-type: none"> • flip charts • manila sheets • marker pens • masking tapes 	<p>Is the student able to state the meaning of farm power?</p> <p>Is the student able to identify various sources of farm power?</p> <p>Is the student able to describe the uses of farm power?</p> <p>Is the student able to recommend the appropriate application of farm power with particular emphasis to their relative costs and suitability?</p>	10

TOPIC/SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEARNING STRATEGIES	TEACHING/LEARNING RESOURCES	ASSESSMENT	ESTIMATED NUMBER OF PERIODS
1.2 Heat Engines	By the end of this sub topic the student should be able to: (a) state the concept of heat engines	(i) The teacher to guide students through a question and answer session to state the meaning and the concept of heat engines. (ii) The teacher to display some heat engine models/scraps for students to observe and conceptualize on heat engines (iii) The teacher to show video programme/pictures to the students so that they develop the right concept of heat engines	<ul style="list-style-type: none"> Engine models engine scraps 	Is the student able to state the concept of heat engines?	30
	(b) identify the classes of heat engines	(i) The teacher to display real specimens of heat engines, pictures or models for students in groups to observe critically the features of heat engines for proper identification of such engines (ii) The teacher to lead group discussion on identification of main classes of heat engines (iii) The teacher to show video programme(s) in order to enable the students to classified heat engines.	<ul style="list-style-type: none"> real objects models pictures 	Is the student able to identify the classes of heat engines?	
	(c) identify the main engine parts	(i) The teacher to display the engine parts/models/pictures (ii) Students to observe displayed main engine parts and identify them.	<ul style="list-style-type: none"> real objects models pictures 	Is the student able to identify the main engine parts?	
	(d) describe the functions of the main engine parts	(i) Using the displayed engine parts, models, or pictures the teacher to guide students to describe functions of the main engine parts. (ii) Students to draw the main engine parts in their notebooks so as to relate shape, patterns and their functions.	<ul style="list-style-type: none"> real objects models pictures 	Is the student able to describe the functions of the main engine parts?	
	(e) employ engine operation principles in farm operations	(i) The teacher to guide group discussion so as to evaluate the engine operating principles with the aid of pictures. (ii) Teacher to arrange and make a farm visit with the students so that the	<ul style="list-style-type: none"> Engines Pictures 	Is the student able to employ engine operation principles in farm operations?	

TOPIC/SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEARNING STRATEGIES	TEACHING/LEARNING RESOURCES	ASSESSMENT	ESTIMATED NUMBER OF PERIODS
Engine Systems	By the end of this sub topic the student should be able to: (a) describe engine systems	teacher or an expert can demonstrate how engine operating principles are employed in farm operations. (i) The teacher to display various engine systems or pictures for students to observe carefully. (ii) The teacher to guide students to describe engine systems through group discussion	<ul style="list-style-type: none"> diagrams pictures engine systems 	Is the student able to describe engine systems?	20
	(b) perform routine servicing operations	(i) The teacher to arrange field trips for practical tasks on routine servicing operations.	<ul style="list-style-type: none"> Tractor engines vehicle engines 	Is the student able to perform routine servicing operations?	20
	By the end of this sub topic student should be able to: (a) identify the workshop tools	(i) The teacher to display workshop tools for students to observe and take notes (ii) Students in pairs to observe and identify the displayed tools.	<ul style="list-style-type: none"> various workshop tools pictures 	Is the student able to identify the workshop tools?	
2.0 WORKSHOP TECHNOLOGY 2.1 Workshop management and organization	(b) demonstrate appropriate use of workshop tools	(i) Guided practical for students to demonstrate appropriate use of workshop tools. (ii) The teacher to arrange workshop visits to perform practicals on appropriate use of workshop tools	<ul style="list-style-type: none"> workshop tools Farm workshop 	Is the student able to demonstrate appropriate use of workshop tools?	
	(c) adopt workshop safety measures	(i) Students in role play to demonstrate how to implement workshop safety measures (ii) The teacher to arrange field trips for students to observe farm workshop	<ul style="list-style-type: none"> protective gears (gloves, goggles, masks, gum boots, overalls) fire extinguishers 	Has the students adopted workshop safety measures?	30
	By the end of this sub topic the student should be able to: (a) explain the meaning of plant disease	(i) The teacher to guide question and answer sessions to explain the meaning of plant disease (ii) The teacher to guide students to collect diseased and healthy plants and/or plant parts and observe them carefully so as to get the correct meaning of plant disease	<ul style="list-style-type: none"> healthy and diseased plants and/or plant parts 	Is the student able to explain the meaning of plant disease?	
3.0 PLANT DISEASES 3.1 Introduction to Plant Diseases					

TOPIC/SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEARNING STRATEGIES	TEACHING/LEARNING RESOURCES	ASSESSMENT	ESTIMATED NUMBER OF PERIODS
3.2 Causes of Plant Diseases	(b) distinguish between pathological and non-pathological diseases	(i) The teacher to guide group discussion on description of pathological vis-à-vis non-pathological diseases	<ul style="list-style-type: none"> diseased plants/plant parts Slides Pictures 	Is the student able to distinguish pathological from non-pathological plant diseases?	20
	(c) explain the importance of plant diseases	(i) The teacher and students to collect and display the diseased plants/plant parts or affected products/goods so as to assess the impact of plant diseases (ii) The teacher to organize field visits for students so as to determine both quality and quantity losses of crops caused by plant diseases	<ul style="list-style-type: none"> diseased plants and plant parts disease affected products field crops 	Is the student able to explain the importance of the plant diseases?	
	(d) describe major symptoms of plant diseases	(i) The teacher and students to collect plant samples depicting major symptoms of plant diseases including: damping-off, soft rot, wilts, powdery and downy mildews, rusts, smuts, blights, leaf spots and anthracnose for proper description of major symptoms of plant diseases (ii) Students to critically observe the samples in groups and then summarize and present their deliberations. (iii) Conduct farm visits in order to observe major plant disease symptoms	<ul style="list-style-type: none"> Diseased plants/plant parts pictures drawings/illustrations 	Is the student able to describe major symptoms of plant diseases?	
	By the end of this sub-topic the student should be able to: (a) name important pathological agents. (b) identify important non-pathological agents	(i) The teacher to guide students to describe through brainstorming important pathological agents (ii) The teacher to summarize and classify important pathological agents (virus, bacteria, fungi and nematodes) (i) The teacher and students to collect diseased plants and plant parts, observe them and identify non-pathological agents (ii) The teacher to guide students to summarize the findings observed.	<ul style="list-style-type: none"> Diseased plants/plant parts pictures drawings/illustrations 	Is the student able to name important pathological agents?	
			<ul style="list-style-type: none"> Diseased plants/plant parts pictures drawings/illustrations 	Is the student able to identify important non-pathological agents?	

TOPIC/SUB TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEARNING STRATEGIES	TEACHING/LEARNING RESOURCES	ASSESSMENT	ESTIMATED NUMBER OF PERIODS
3.3 Principles of Plant Disease Control	By the end of this sub topic the student should be able to: (a) explain the principles of plant diseases control	(i) The teacher using pictures and other illustrations to guide the students in explaining the main principles of plant disease control (ii) Students in groups to discuss the principles of plant disease control which are cultural, biological, physical, chemical and integrated control (iii) The teacher to arrange farm visits for students so that they gain practical experience on the principles of plant disease control	<ul style="list-style-type: none"> • pictures • illustrations • crops growing in the farm • plant disease control chemicals • plant disease control equipment 	Is the student able to explain the principles of plant diseases control?	20
	(b) select the appropriate control techniques	(i) The teacher to guide the students in a question and answer session so that they develop their ability to select appropriate plant disease control technique. (ii) The teacher to summarize the techniques proposed by the students with special emphasis to environmental friendly techniques	<ul style="list-style-type: none"> • flip charts • manila sheets • marker pens 	Is the student able to select the appropriate control techniques?	
4.0 INTRODUCTION TO WEED SCIENCE	By the end of the sub - topic the student should be able to: (a) state the meaning of weeds	(i) The teacher to guide students in question and answer session develop the correct meaning of weeds (ii) The teacher and students to collect weeds and study them carefully	<ul style="list-style-type: none"> • flip charts • manila sheets • marker pens • weeds 	Is the student able to state the meaning of weeds?	30
4.1 Biology and Ecology of Weeds	(b) explain the economic importance of weeds	(i) The teacher to guide the students in groups to discuss the economic importance of weeds, thereafter, each group should present a summary of their deliberations (ii) Students to assess the importance of weeds through field visits and observations.	<ul style="list-style-type: none"> • flip charts • manila sheets • marker pens • weed infested farms 	Is the student able to explain the economic importance of weeds?	

TOPIC/SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEARNING STRATEGIES	TEACHING/LEARNING RESOURCES	ASSESSMENT	ESTIMATED NUMBER OF PERIODS
4.2 Principles of Weed Control	(c) identify common weeds	(i) Students to collect and observe common weeds (ii) The teacher to guide students to identify the common weeds correctly. (iii) The teacher to organize field visits for students to explore more common weeds	<ul style="list-style-type: none"> Common weeds Herbarium cello tape old news papers 	Is the student able to identify common weeds?	10
	(d) distinguish between noxious and non-noxious weeds	(i) The teacher to guide students to collect noxious and non-noxious weeds collectively (ii) The teacher to guide students to distinguish the collected weeds (iii) The teacher to guide the students for correct distinction of noxious and non-noxious weeds	<ul style="list-style-type: none"> noxious and non-noxious weeds weed infested farms 	Is the student able to distinguish between noxious and non-noxious weeds?	
	(e) classify the common weeds based on morphology and ecology	(i) Students to collect and observe common weeds or use preserved weeds for the classification (ii) The teacher to guide the students so that they do proper classification of weeds based on morphology and ecology.	<ul style="list-style-type: none"> common weeds herbarium lens 	Is the student able to classify the common weeds based on morphology and ecology?	
	By the end of the sub topic the student should be able to: (a) outline the important principles of weed control (b) explain principles of weed control	(i) Students to brainstorm on principles of weed control (ii) The teacher to summarize important principles as outlined by students (i) The teacher to guide students in groups to explain the methods/techniques under each principle and to present them in a gallery walk (ii) The teacher to arrange field trips or use video programme so that students can observe how the principles of weed control are used.	<ul style="list-style-type: none"> flip charts manila sheets marker pens <ul style="list-style-type: none"> flip charts manila sheets farms 	Is the student able to outline the important principles of weed control? Is the student able to explain principles of weeds control?	

TOPIC/SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEARNING STRATEGIES	TEACHING/LEARNING RESOURCES	ASSESSMENT	ESTIMATED NUMBER OF PERIODS
5.0 INTRODUCTION TO ANIMAL NUTRITION Feed and Feed Utilization	(c) employ the principles of weed control in agricultural production	(i) Students in groups to brainstorm on appropriate principles of weed control and make presentations (ii) The teacher to summarize proposed principles to employ in weed control with special emphasis to environmentally friendly principles	<ul style="list-style-type: none"> • flip charts • manila sheets • marker pens 	Is the student able to employ the principles of weed control in agricultural production?	40
	By the end of the sub topic the student should be able to: (a) define feed and the concept of digestion	(i) The teacher to guide students in question and answer sessions to develop the correct concept of feed and digestion (ii) The teacher to display feed samples for practical exposure	<ul style="list-style-type: none"> • flip charts • manila sheets • marker pens • Feed samples 	Is the student able to define feed and concept of digestion?	
	(b) account for different digestive systems of farm animals	(i) Students to brainstorm on different digestive systems of farm animals (ii) The teacher to display different digestive systems for the students to observe so that they can have clear understanding (iii) Students to draw and label each digestive system	<ul style="list-style-type: none"> • digestive systems of different farm animals • pictures 	Is the student able to account for different digestive systems of farm animals?	
	(c) explain the main feed components and their roles	(i) The teacher to guide the students in question and answer sessions to name main food components (ii) Students in group discussion to explain the roles of food components	<ul style="list-style-type: none"> • Feed samples • Foods components 	Is the student able to explain the main feed components and their roles?	
	(d) identify common feeds	(i) The teacher to display important feeds (ii) The teacher to guide students to observe common feeds and identify them.	<ul style="list-style-type: none"> • Feeds (various) 	Is the student able to identify common feeds?	
	(e) explain feed factors which can pose limitations in feed utilization	(i) Students to brainstorm on factors that can limit feed utilization (anti-nutritional factors and poisons) (ii) The teacher to discuss with the students relevant feed factors which can pose limitations in feed utilization and the ways of handling them	<ul style="list-style-type: none"> • feeds 	Is the student able to explain limitations of feed utilization?	

TOPIC/SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEARNING STRATEGIES	TEACHING/LEARNING RESOURCES	ASSESSMENT	ESTIMATED NUMBER OF PERIODS
	(f) select different feeds for appropriate classes of farm animals	(i) Students in group discussion to suggest types of feeds for feeding appropriate classes of farm animals.	<ul style="list-style-type: none"> Feeding standard tables 	Is the student able to select different feeds for appropriate classes of farm animals?	
5.2 Feed Formulation	By the end of this sub topic the student should be able to:	(i) The teacher to discuss with students how to interpret the feeding standard tables	<ul style="list-style-type: none"> Feeding standard tables 	Is the student able to interpret feeding standard tables?	10
	(a) interpret feeding standard tables (b) formulate balanced rations	(i) Students to collect required feeds for balanced ration(s) (ii) The teacher to guide the students to do proper feed formulation using available feed sources while considering anti nutritional factors and poisons	<ul style="list-style-type: none"> Feeding standard tables Feed sources weighing scales feed containers 	Is the student able to formulate balanced rations?	
6.0 PASTURE: AGRONOMY 6.1 Types of Pastures and Pasture Agronomy	By the end of this sub topic the student should be able to:	(i) The teacher to lead the students in a question and answer sessions so that they grasp the correct meaning of pasture and pasture management. (ii) The teacher to arrange field visits so that students can observe the main features of pastures and pasture management (iii) Teacher to guide students to summarize the main features observed during the visits	<ul style="list-style-type: none"> flip charts manila sheets marker pens pastures 	Is the student able to explain the meaning of pasture and pasture agronomy?	20
	(b) identify important pasture species	(i) The teacher to display the important pasture species so that the students can identify them (ii) The teacher to organize farm visits so that students can have more exposure to pasture species	<ul style="list-style-type: none"> pasture species herbarium slide show photographs video pictures 	Is the student able to identify important pasture species?	
	(c) classify important pasture species	(i) The teacher to display pasture species for the student to classify (ii) Students to observe the displayed pastures/pictures and take notes	<ul style="list-style-type: none"> pasture species herbarium slide show photographs 	Is the student able to classify important pasture species?	

TOPIC/SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEARNING STRATEGIES	TEACHING/LEARNING RESOURCES	ASSESSMENT	ESTIMATED NUMBER OF PERIODS
		(iii) The teacher to guide them to do proper classification using laid down procedures	<ul style="list-style-type: none"> • video • pictures 		
	(d) describe nutritional status of different pasture species	(i) The teacher to guide students in groups to describe nutritional status of pasture species (ii) The teacher to guide students to summarize important concepts developed by groups and then present them (iii) Students in groups to collect different types of pasture species on the basis of nutritional status	<ul style="list-style-type: none"> • pasture species • herbarium 	Is the student able to describe nutritional status of different pasture species?	
6.2 Pasture Improvement	By the end of this sub topic the student should be able to:	(i) The teacher to identify undesirable species in the pastures and then show them to the students (ii) Students to observe the undesirable pastures ask questions and take notes.	<ul style="list-style-type: none"> • undesirable pasture species • herbarium 	Is the student able to identify undesirable species in pasture?	10
	(b) solve the problems of undesirable species encroachment	(i) The teacher to guide students in group discussion to suggest ways to solve problems of undesirable species encroachment in pasture (ii) The teacher to summarize the main concepts developed during the group discussions (iii) The teacher to organize field work for the students (to perform the tasks of removing undesirable pasture species)	<ul style="list-style-type: none"> • flip charts • marker pens • pastures infested with undesirable species 	Is the student able to solve the problems of undesirable species encroachment?	
	(c) outline important methods of pasture improvement.	(i) The teacher to guide students in groups to discuss on methods of pasture improvement (ii) The teacher to summarize groups deliberations (iii) The teacher to arrange field visits (or use video programmes) so that students appreciate important methods	<ul style="list-style-type: none"> • farms which employ different methods of pasture improvement • slide/video show 	Is the student able to outline important methods of pasture improvement?	

TOPIC/SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEARNING STRATEGIES	TEACHING/LEARNING RESOURCES	ASSESSMENT	ESTIMATED NUMBER OF PERIODS
		of pasture improvement			
	(d) apply appropriate methods of pasture improvement	(i) The teacher to guide group discussion on viable methods of pasture improvement which are appropriate in a given environment	<ul style="list-style-type: none"> slide show 	Is the student able to apply appropriate methods of pasture improvement?	
7.0 AGRICULTURAL PRODUCTION ECONOMICS	By the end of this sub topic the student should be able to:	(i) Through questions and answers teacher to guide students so that they develop correct concept of agricultural production economics (ii) The teacher to summarize the main concepts proposed by the students and then make concluding remarks	<ul style="list-style-type: none"> flip charts manila sheets marker pens illustrations 	Is the student able to explain the concept of agricultural production economics?	6
7.1 Introduction to Production Economics	(a) explain the concept of agricultural production economics (b) account for the factors of production	(i) The teacher to lead group discussion so that the students account for the factors of production (land, capital, labours entrepreneurship) (ii) The teacher to summarize the key factors of production with emphasis to their importance in production	<ul style="list-style-type: none"> flip charts manila sheets marker pens 	Is the student able to account for each of the factor of production?	
7.2 Producer Decisions	By the end of this sub topic the student should be able to:	(i) Teacher to lead students to brainstorm on important producer decisions in any agricultural production enterprise (ii) The teacher to summarize the main factors as explained by the students and give concluding remarks.	<ul style="list-style-type: none"> flip charts manila sheets marker pens 	Is the student able to explain each important producer decision involved in any agricultural enterprise?	20
	(a) explain important producer decisions (b) use producer decisions for profit maximization	(i) The teacher to lead the students to do exemplary computations for profit maximization (ii) Students to perform computation tasks and draw various production graphs	<ul style="list-style-type: none"> calculator production schedules pencil graph papers rubber 	Is the student able to use producer decisions for profit maximization?	
7.3 Effects of HIV/AIDS on Labour Productivity	By the end of this sub topic the student should be able to:	(i) Students to brainstorm on impact of HIV/AIDS on agricultural production (ii) The teacher to lead group discussion and presentation on effects of HIV/AIDS on labour productivity	<ul style="list-style-type: none"> flip charts manila sheets slide or video show national statistics 	Is the student able to account for the effects of HIV/AIDS on labour	10

TOPIC/SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEARNING STRATEGIES	TEACHING/LEARNING RESOURCES	ASSESSMENT	ESTIMATED NUMBER OF PERIODS
	on labour productivity (b) explain how HIV/AIDS affect resource allocation in agricultural production	(iii) The teacher to summarize group resolutions (i) The teacher to lead group discussion and presentations on resource allocation (ii) Role play to be guided by the teacher for students to explain effects of HIV/AIDS on resource allocation in agricultural production. (iii) The teacher to use video/slide show so that the students appreciate the impact of HIV/AIDS in agricultural sector	<ul style="list-style-type: none"> national budgets pictures HIV/AIDS data 	productivity? Is the student able to explain how HIV/AIDS affect resource allocation in agricultural production?	
	(c) apply appropriate measures to control the HIV/AIDS among vulnerable groups	(i) The teacher to lead group discussion on how to apply appropriate measures to combat HIV/AIDS (ii) The teacher to guide students in role play to show the use of appropriate measures to control HIV/AIDS	<ul style="list-style-type: none"> flip charts manila sheets marker pens condoms 	Is the student able to apply appropriate measures to control the HIV/AIDS among vulnerable groups?	
7.4 Valuation of Farm Assets and Calculation of Depreciation	By the end of this sub topic the student should be able to: (a) Value farm assets	(i) Students to brainstorm on how to value farm assets and the reasons to do so (ii) The teacher to summarize important features on valuation of farm assets	<ul style="list-style-type: none"> flip charts marker pens farm assets 	Is the student able to value farm assets?	20
	(b) describe methods of determining depreciation	(i) The teacher to guide students to describe methods of determining depreciation (in group discussion) (ii) Students to determine depreciation using straight line, declining balance and sum of year digits methods	<ul style="list-style-type: none"> calculators 	Is the student able to describe methods of determining depreciation?	
	(c) apply the methods of computing depreciation for different farm assets	(i) Students to work in pairs to compute depreciation of farm assets (ii) The teacher to guide students to perform correct computations	<ul style="list-style-type: none"> calculators graph sheets manila sheets marker pens 	Is the student able to apply the methods of computing depreciation for different farm	

TOPIC/SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEARNING STRATEGIES	TEACHING/LEARNING RESOURCES	ASSESSMENT	ESTIMATED NUMBER OF PERIODS
8.0 FARM PLANNING	By the end of this sub topic the student should be able to:	(i) The teacher to lead students to brainstorm on the concept of farm planning (ii) The teacher to summarize important concepts as put forward by the students and make conclusive remarks	<ul style="list-style-type: none"> flip charts manila sheets marker pens 	assets?	20
8.1 Introduction to Farm Planning	(a) explain the concept of farm planning (b) describe the important tools of farm planning	(i) The teacher to lead students in groups to discuss important tools of farm planning (ii) The teacher to guide students to describe tools of planning (budgeting and programme planning) (iii) The teacher to summarize important features of the tools used in farm planning	<ul style="list-style-type: none"> flip charts manila sheets marker pens 	Is the student able to explain the concept of farm planning? Is the student able to describe the important tools of farm planning	
	(c) perform computations using the tools of farm planning (d) make rational production decisions	(i) Students in pairs to perform computations using the tools for practical experience (ii) The teacher to lead students in groups to discuss on how to make rational production decisions (iii) The teacher to summarize important rational production decisions	<ul style="list-style-type: none"> flip charts manila sheets marker pens calculators 	Is the student able to perform computations using the tools of farm planning? Is the student able to make rational production decisions?	
9.0 INTRODUCTION TO SOIL SCIENCE	By the end of this sub topic the student should be able:	(i) Students to brainstorm on concept of soil (ii) The teacher to summarize the important concepts of soil and make conclusive remarks	<ul style="list-style-type: none"> flip charts manila sheets marker pens 	Is the student able to explain the concept of soil as it is used in agricultural production?	30
9.1 Weathering and Soil Formation	(a) explain the concept of soil as it is used in agricultural production (b) describe meaning of weathering and weathering processes	(i) The teacher to show the students weathering processes both in the field and by using pictures, video tapes or slide show. (ii) The teacher to guide students in	<ul style="list-style-type: none"> specimens pictures relevant sites slides 	Is the student able to describe the weathering processes?	

TOPIC/SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEARNING STRATEGIES	TEACHING/LEARNING RESOURCES	ASSESSMENT	ESTIMATED NUMBER OF PERIODS
		groups to discuss the weathering processes	<ul style="list-style-type: none"> • video tapes 		
	(c) describe the role of soil formation factors	(i) The teacher to lead the students in groups to discuss influence of each soil forming factor (ii) Students to visit various sites to observe influence of factors of soil formation	<ul style="list-style-type: none"> • specimens • pictures • relevant sites • slides • video tapes 	Is the student able to describe the role of soil formation factors?	
	(d) identify different soil horizons	(i) The teacher to arrange for site visits for the students to observe different soil horizons (ii) Students to make observations on soil profiles and identify important soil horizons (iii) Students to draw typical soil profile horizons	<ul style="list-style-type: none"> • soil pits • excavations 	Is the student able to identify different soil horizons?	
	(e) relate soil profile and soil management practices	(i) Students to brainstorm on the relationship between soil profile and management practices	<ul style="list-style-type: none"> • soil pits • excavations 	Is the student able to relate soil profile and soil management practices?	
9.2 Physical Properties of the Soil	By the end of this sub topic the student should be able to: (a) explain physical properties of the soil	(i) Students to brainstorm on physical properties of the soil (ii) The teacher to summarize important soil physical properties (iii) Students to determine soil physical properties in the agriculture laboratory	<ul style="list-style-type: none"> • soil samples • sieves • measuring cylinders • mortar • water 	Is the student able to explain physical properties of soil?	24
	(b) account for the importance of each physical property of the soil	(i) The teacher to display soil samples so that students can observe them and then asked to point out the importance of each physical property (ii) The teacher to lead students in groups to account for the roles of physical properties of soil (iii) The teacher to arrange farm/site visits for the students so that they can appreciate the importance of each	<ul style="list-style-type: none"> • soil samples • flip charts • manila sheets • marker pens • transport • soil auger 	Is the student able to account for the importance of each physical property of the soil?	

TOPIC/SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEARNING STRATEGIES	TEACHING/LEARNING RESOURCES	ASSESSMENT	ESTIMATED NUMBER OF PERIODS
		physical property of the soil			
	(c) use knowledge on soil physical properties to manage the soil for improved land productivity	(i) The teacher to lead group discussions on the application of soil physical properties in management of the soil (ii) The teacher to summarize the importance of soil physical properties on the improved management and productivity of the soil	<ul style="list-style-type: none"> • flip charts • manila sheets • marker pens 	Is the student able to use knowledge on soil physical properties to manage the soil for improved land productivity?	

FORM SIX

CLASS COMPETENCES

At the end of form six the student should have the ability to:

1. use intuition to critically think on how to solve agricultural related problems
2. demonstrate the application of developed agricultural technologies in the working environment
3. create self employment opportunities from the various agricultural sectors
4. collect, analyse interpret given agricultural numerical data into meaningful information that can be used to make appropriate decisions; and
5. develop attitude that agriculture is a self employing enterprise

CLASS OBJECTIVES

At the end of form six the student should be able to:

1. identify and critically think on how to solve agricultural related problems
2. develop the necessary knowledge, skills and attitude required for self employment
3. develop skills for data collection, organization, analysis and interpretation of agricultural based activities
4. apply developed agricultural technologies in the working environment
5. appreciate that agriculture is a self employing enterprise; and
6. develop awareness of global threats that have an impact on agriculture such as Genetically Modified Organisms (GMOs), deforestation, green house effect, pollution and global warming.

TOPIC/SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEARNING STRATEGIES	TEACHING/LEARNING RESOURCES	ASSESSMENT	ESTIMATED NUMBER OF PERIODS
1.0 FARM MECHANIZATION AND MACHINERY	By the end of this sub topic the student should be able to: (a) explain briefly the importance of agricultural mechanization (b) identify farm implements	(i) The teacher to lead the students in groups to discuss on the importance of agricultural mechanization (ii) The teacher to arrange a farm visits or display pictures of implements so that students can identify them	<ul style="list-style-type: none"> • flip charts • manila sheets • marker pens • pictures 	Is the student able to explain briefly the importance of agricultural mechanization?	10
1.1 Introduction to Agricultural Mechanization			<ul style="list-style-type: none"> • farm implements • pictures 	Is the student able to identify farm implements?	
1.2 Types of Implements and Machinery	By the end of this sub topic the student should be able to: (a) distinguish tillage, planting, weeding, dusting, harvesting, threshing and winnowing implements/machines	(i) The teacher to display farm implements (ii) Students to observe the displayed implements critically (iii) Students to be guided by the teacher to distinguish the displayed implements/machines	<ul style="list-style-type: none"> • implements • models • Pictures • machines 	Is the student able to distinguish tillage, planting, weeding, and dusting, harvesting, threshing and winnowing implements/machines?	10
2.0 FARM STRUCTURES	By the end of this sub topic the student should be able to: (a) explain the concept of farm structure (b) identify farm structures	(i) The teacher to lead question and answer sessions for the students so that they develop correct concept of farm structures (i) Students to critically observe the structures or displayed pictures of different farm structures and identify each of them	<ul style="list-style-type: none"> • flip charts • manila sheets • marker pens 	Is the student able to explain the meaning of farm structures?	10
2.1 Introduction to Farm Structures			<ul style="list-style-type: none"> • specimens • Pictures • slides/video 	Is the student able to identify farm structures?	
2.2 Functional Requirements of Farm Buildings	By the end of this sub topic the student should be able to: (a) describe functional requirements of farm buildings (b) identify different building materials and their uses	(i) Students in groups to brainstorm on ideal requirements of farm buildings (ii) The teacher to summarize the functional requirements of farm buildings and give concluding remarks (i) The teacher to arrange for visits to hardware or display specimens of building materials so that the students can observe the variety of materials used in the construction of farm	<ul style="list-style-type: none"> • Various farm structures • pictures of farm structures 	Is the student able to describe functional requirements of farm buildings?	10
			<ul style="list-style-type: none"> • specimens • pictures 	Is the student able to identify building materials and their uses?	

TOPIC/SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEARNING STRATEGIES	TEACHING/LEARNING RESOURCES	ASSESSMENT	ESTIMATED NUMBER OF PERIODS
3.0 INTRODUCTION TO IRRIGATION 3.1 Meaning and importance of Irrigation		buildings (ii) The teacher or an expert to discuss with students on the uses of various building materials			4
	By the end of this sub topic the student should be able to: (a) explain the meaning of irrigation (b) outline the importance of irrigation	(i) The teacher to let the students brainstorm so that they derive the meaning of irrigation (ii) The teacher to summarize the meaning of irrigation (i) The teacher to lead group discussions to outline the importance of irrigation (ii) The teacher to guide students to summarize their group deliberations in flip charts or manila sheet and present them in a gallery walk (iii) The teacher to give concluding remarks on importance of irrigation.	<ul style="list-style-type: none"> flip charts manila sheets marker pens books 	Is the student able to explain the meaning of irrigation?	
	(c) describe situations that necessitate irrigation	(i) The teacher to lead students in pairs to describe situations that necessitate irrigation (ii) The teacher to make summary and conclusions on situations that necessitate irrigation.	<ul style="list-style-type: none"> flip charts manila sheets marker pens books 	Is the student able to describe situations that necessitate irrigation?	
3.2 Methods of Irrigation	By the end of this sub topic the student should be able to: (a) outline main methods of irrigation	(i) The teacher through questions and answers to lead the students to outline the main methods of irrigation namely surface, subsurface and overhead irrigation (ii) The teacher to display pictures/slides/video showing main methods of irrigation or arrange visits to farms where irrigation is done.	<ul style="list-style-type: none"> manila sheets marker pens pictures slides films/video 	Is the student able to outline the main methods of irrigation?	20
	(b) identify suitable water sources for irrigation	(i) Teacher to lead students to do group discussions in order to identify	<ul style="list-style-type: none"> water sample 	Is the student able to identify suitable	

TOPIC/SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEARNING STRATEGIES	TEACHING/LEARNING RESOURCES	ASSESSMENT	ESTIMATED NUMBER OF PERIODS
		<p>suitable sources of water for irrigation</p> <p>(ii) The teacher to summarize the groups' deliberations and conclude on quality of suitable water for irrigation</p>		water sources for irrigation?	
4.0 LIVE STOCK REPRODUCTION, BREEDING AND IMPROVEMENT	By the end of this sub topic the student should be able to:	(i) Teacher to let students in groups brainstorm so as to derive the meaning of reproduction in farm animals	<ul style="list-style-type: none"> • flip charts • manila sheets • marker pens 	Is the student able to explain the meaning of reproduction in farm animals?	10
	(a) explain the meaning of reproduction in farm animals	(ii) Teacher to lead each group to make presentation so that the whole class comes to agreement			
4.1 Anatomy of the Reproductive Systems of Farm Animals		(iii) The teacher to give concluding remarks on the meaning of reproduction in farm animals			
	(b) describe the anatomy of male and female reproductive systems (Cattle, goat, sheep, swine and poultry).	(i) The teacher to lead students in groups to observe actual organs, models, slides, drawn diagrams, slides or video of both male and female reproductive systems of cattle, goat, sheep, swine and poultry	<ul style="list-style-type: none"> • slides • models • pictures • video • diagrams • specimens 	Is the student able to describe the anatomy of male and female reproductive systems (cattle, goat, sheep, swine and poultry)?	
4.2 Physiology of Reproduction	By the end of this sub topic the student should be able to:	(ii) Teacher to lead students in groups to draw and describe the anatomy of male and female with special emphasis on the various parts and their functions			20
	(a) explain the meaning of physiology as related to reproduction	(i) The teacher to lead the students in groups to brainstorm so that they conceptualize the physiology of reproduction	<ul style="list-style-type: none"> • flip charts • manila sheets • marker pens 	Is the student able to explain the meaning of physiology as it is related to reproduction?	
	(b) describe the formation of reproductive cells (spermatogenesis and oogenesis)	(ii) The teacher to give concluding remarks from groups on explanation of the meaning of physiology as related to reproduction			
		(i) With an aid of diagrams or pictures students in groups to discuss and then describe the formation of reproductive cells covering spermatogenesis in males and oogenesis in female farm animals	<ul style="list-style-type: none"> • drawings • pictures • models 	Is the student able to describe the formation of reproductive cells	
		(ii) The teacher to guide students to summarize group deliberations on flip			

TOPIC/SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEARNING STRATEGIES	TEACHING/LEARNING RESOURCES	ASSESSMENT	ESTIMATED NUMBER OF PERIODS
		charts/manila sheets and present them (iii) The teacher to give a concluding summary on description of the formation of reproductive cells			
	(c) account for different stages of oestrus cycle	(i) Using questions and answers session the teacher to lead the students to outline the stages of the oestrus cycle in farm animals namely cattle, goats, sheep and swine. Also point out the difference found in poultry (ii) Students in pairs to think and share knowledge and then account for the importance of each stage of the oestrus cycle (iii) The teacher to lead students to summarize and share deliberations (iv) The teacher to give concluding remarks to account for different stages of oestrus cycle	<ul style="list-style-type: none"> • pictures • drawings • slides • flip charts • manila sheets • marker pens 	Is the student able to account for the oestrus cycle?	
4.3 Livestock Breeding and Improvement	By the end of this sub topic the student should be able to: (a) explain the concept of livestock breeding and improvement	(i) The teacher to lead a questions and answers session so as to explore the meaning of livestock breeding and improvement (ii) Students in pairs to think and relate livestock breeding and improvement (iii) The teacher to summarize students' deliberations and give concluding remarks.	<ul style="list-style-type: none"> • flip charts • manila sheets • marker pens 	Is the student able to explain the concept of livestock breeding and improvement?	16
	(b) explain the importance of livestock breeding	(i) The teacher to lead students in group discussions to explain the importance of livestock breeding (ii) Teacher to guide students to summarize group deliberations on flip charts/ manila sheets for presentation.	<ul style="list-style-type: none"> • flip charts • manila sheets • marker pens 	Is the student able to explain the importance of livestock breeding?	
	(c) describe methods of livestock breeding	(i) The teacher to lead the students in questions and answers to describe	<ul style="list-style-type: none"> • flip charts • manila sheets 	Is the student able to describe	

TOPIC/SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEARNING STRATEGIES	TEACHING/LEARNING RESOURCES	ASSESSMENT	ESTIMATED NUMBER OF PERIODS
		<p>methods of livestock breeding namely line, cross, up-grading and inbreeding methods</p> <p>(ii) Students in groups to discuss to and describe each method of livestock breeding with emphasis to advantages and limitations</p> <p>(iii) The teacher to summarize students' deliberations and give concluding remarks</p>	<ul style="list-style-type: none"> • marker pens • pictures 	methods of livestock breeding?	
4.4 Livestock Breeding Techniques	<p>By the end of this sub topic the student should be able to:</p> <p>(a) explain the meaning of natural mating and artificial insemination (A.I)</p> <p>(b) outline the scope of Artificial Insemination including semen collection, processing storage and insemination</p>	<p>(i) The teacher to lead students in a questions and answers session to explain techniques of breeding (natural mating and artificial insemination)</p> <p>(i) Students to watch and observe carefully pictures/slides on semen collection, processing, storage and insemination</p> <p>(ii) Students to discuss and explain the scope of A.I</p> <p>(iii) Students to summarize the group deliberations on flip charts/manila sheets and present them.</p> <p>(iv) The teacher to organize a visit to an A.I centre or invite subject specialist to outline and demonstrate semen collection, processing, storage and insemination</p>	<ul style="list-style-type: none"> • flip charts • manila sheets • marker pens <ul style="list-style-type: none"> • Artificial vagina • pistillates • straws • sheaths • liquid nitrogen containers • video/slide show 	<p>Is the student able to explain the meaning of natural and artificial insemination?</p> <p>Is the student able to outline the scope of Artificial Insemination?</p>	10
	<p>(c) compare the importance of Artificial Insemination vis-à-vis natural mating</p>	<p>(i) In groups, students to explore comparative advantages and limitations of natural mating and A.I</p> <p>(ii) Each group to summarize the comparative advantages and limitations of natural mating and A.I for presentation</p> <p>(iii) The teacher to make concluding</p>	<ul style="list-style-type: none"> • flip charts • manila sheets • marker pens 	Is the student able to compare the importance of Artificial Insemination vis-à-vis natural mating?	

TOPIC/SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEARNING STRATEGIES	TEACHING/LEARNING RESOURCES	ASSESSMENT	ESTIMATED NUMBER OF PERIODS
5.0 INTRODUCTION TO ANIMAL HEALTH		remarks on comparative advantages and limitation of natural mating and A.J			
5.1 Meaning and Scope of Animal Health	By the end of this sub topic the student should be able to: (a) explain the meaning and the parameters of a healthy animal	(i) The teacher to lead students in groups to brainstorm meaning of animal health in relation to animal production (ii) Using pictures, video or slides the teacher to lead students in groups to explain parameters to be assessed in healthy and diseased animals (iii) Students to summarize their deliberations on flip charts or manila sheets for presentation and teacher to make clarification	<ul style="list-style-type: none"> flip charts manila sheets marker pens pictures 	Is the student able to explain the meaning and the parameters of healthy animal?	5
5.2 Animal Parasites	By the end of this sub topic the student should be able to: (a) categorize types of parasites	(i) Through think-pair and share students be guided to classify the common parasites in farm animals with emphasis to two main categories: ecto-parasites (ticks and tsetse fly) and endo-parasites (liver fluke and round worm)	<ul style="list-style-type: none"> specimens pictures 	Is the student able to categorize types of parasites?	20
	(b) explain how to control animal parasites	(i) The teacher to lead students in groups to explain control measures of animal parasites (ii) Students to summarize and present their group work deliberations (iii) Students to participate in carrying out the practices used to control parasites such dipping, spraying, deworming and trapping of tsetse fly	<ul style="list-style-type: none"> sprayers dip tanks hand sprayers tsetse fly traps 	Is the student able to explain how to control animal parasites?	
	(c) apply appropriate control measures of animal parasites	(i) Using think-pair and share and video screening the teacher to guide students to brainstorm on application of appropriate control measures for animal parasites (ii) Students to summarize and present their deliberations (iii) The teacher to clarify and conclude on students' deliberations	<ul style="list-style-type: none"> flip charts marker pens manila sheets 	Is the student able to apply appropriate control measures for animal parasites?	

TOPIC/SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEARNING STRATEGIES	TEACHING/LEARNING RESOURCES	ASSESSMENT	ESTIMATED NUMBER OF PERIODS
5.2.1 Animal Diseases	By the end of this sub topic the student should be able to: (a) explain the meaning of animal diseases (b) classify types and causes of animal diseases	(i) Students in groups to brainstorm the meaning of animal diseases (ii) The teacher to lead groups to summarize and present their deliberations on the meaning of animal diseases (i) The teacher to lead the students in question and answer sessions to classify types and causes of animal diseases (namely pathological: protozoan, bacterial and virus and non- pathological) (ii) The teacher to present clarifying and concluding remarks on the classes and types of causes of animal diseases	<ul style="list-style-type: none"> • flip charts • marker pens • manila sheets <ul style="list-style-type: none"> • flip charts • marker pens • pictures 	Is the student able to explain the meaning of animal diseases? Is the student able to classify types and causes of animal diseases	5
5.2.2 Selected Pathological Diseases	By the end of this sub topic the student should be able to: (a) describe selected pathological diseases with emphasis to Protozoan: (HCT, Coccidiosis); Bacterial: (Anthrax, fowl typhoid); Viral: (FMD, Newcastle) diseases (b) explain the non pathological disorders with emphasis to poisonous plants, polythene bags, nails and snake bites	(i) The teacher to lead group discussions on the description of selected pathological diseases in terms of prevalence, causative agents, transmission and symptoms, control and treatment (ii) Teacher to arrange visits to veterinary investigation centres (VIC) or invite an expert (iii) The teacher to display slides/video, sick animals and/or diseased organs so that the students can observe and take notes. (i) The teacher to lead students in groups to discuss on important non pathological disorders with emphasis to poisonous plants, snake bites, polythene papers and nails (ii) Students to observe carefully the displayed specimens, pictures, video or slides so that they can appreciate the nature and characteristics of non pathological disorders common in farm animals	<ul style="list-style-type: none"> • flip charts • manila sheets • marker pens • pictures • specimens • microscopes • slides <ul style="list-style-type: none"> • specimens • pictures • flip charts • marker pens 	Is the student able to describe the selected pathological diseases Is the student able to explain the non pathological disorders?	20

TOPIC/SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEARNING STRATEGIES	TEACHING/LEARNING RESOURCES	ASSESSMENT	ESTIMATED NUMBER OF PERIODS
6.0 CROP PESTS		(iii) The teacher to give concluding remarks on nature and characteristics of non pathological disorders common in farm animals.			
6.1 Importance of Crop Pests	By the end of this sub topic the student should be able to: (a) explain the meaning of crop pests (b) explain the importance of crop pests	(i) Teacher to lead students in question and answer sessions to explain the meaning of crop pests (ii) The teacher to present clarifying and concluding remarks on the meaning of crop pests (i) The teacher to guide students in groups to discuss the importance of crop pests (ii) The teacher to display pictures/slides/video showing the effects of various crop pests or arrange visits to pest infested farms so that students can see and assess the effects of crop pests (iii) The teacher to summarize students' deliberations and give concluding remarks	<ul style="list-style-type: none"> • flip charts • manila sheets • marker pens <ul style="list-style-type: none"> • flip charts • marker pens • manila sheets • pictures • slides • video • specimens 	<p>Is the student able to explain the meaning of crop pests?</p> <p>Is the student able to explain the importance of crop pests?</p>	4
6.2 Insect Pests	By the end of this sub topic the student should be able to: (a) classify the insect pests (exopterygota and endopterygota) (b) describe important destructive insect orders (c) outline losses caused by insect pests	<p>(i) The teacher and students to collect insect pests</p> <p>(ii) The teacher to guide students to use the identifying features to classify the collected insect pests</p> <p>(i) The teacher to guide students on the characteristics to be considered in the description of insect pests</p> <p>(ii) Students in groups to describe the insect pests using specimens, pictures or video illustrations</p> <p>(i) The teacher to lead students in groups to brainstorm on quantity and quality losses caused by insect pests</p> <p>(ii) Students to summarize the groups' deliberations on flip charts or manila sheets for presentation</p>	<ul style="list-style-type: none"> • specimens • well drawn charts • tree diagrams <ul style="list-style-type: none"> • real objects • pictures • video • slides <ul style="list-style-type: none"> • flip charts • marker pens • manila sheets • damaged crops/products • pictures 	<p>Is the student able to classify the insect pests?</p> <p>Is the student able to describe important destructive insect orders?</p> <p>Is the student able to outline losses caused by insect pests?</p>	30

TOPIC/SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEARNING STRATEGIES	TEACHING/LEARNING RESOURCES	ASSESSMENT	ESTIMATED NUMBER OF PERIODS
6.3 Vermin	By the end of this sub topic the student should be able to: (a) explain the meaning of vermin (b) describe important types of vermin (Animals, birds)	(iii) The teacher to give clarifying and concluding remarks on the losses caused by insect pests (i) The teacher to let students in groups to brainstorm on the meaning of vermin (ii) The teacher to give concluding remarks on the meaning of vermin (i) The teacher to lead students in groups to describe the important types of vermin of economic importance in agricultural production with emphasis to type of damage they cause (ii) The teacher to display the collected specimens or pictures of vermin for students to observe and describe (i) The teacher to let students brainstorm principles used in crop pest control with emphasis to cultural, physical, chemical, biological and integrated control. (ii) Students in groups to discuss methods under each principle of crop pests control (iii) The teacher to lead students to summarize the group deliberations and present (iv) The teacher to give concluding remarks on the principles of controlling crop pests (i) Students to brain storm on appropriate principles of pest control with emphasis to environmentally friendly principles (ii) The teacher to give clarifying and concluding remarks on the appropriate principles of crop pests control	<ul style="list-style-type: none"> • video • slides • flip charts • manila sheets • marker pens • pictures of vermin • flip charts • marker pens • manila sheets • traps, baits • slides • pictures • specimens • flip charts • marker pens • manila sheets • pesticides • pictures • slides • video • flip charts • marker pens • manila sheets 	<p>Is the student able to explain the meaning of vermin?</p> <p>Is the student able to describe important types of vermin (Animals, birds)?</p> <p>Is the student able to describe principles of crop pest control?</p> <p>Is the student able to recommend appropriate principles of crop pest control?</p>	6
6.4 Principles of Pests Control	By the end of this sub topic the student should be able to: (a) describe principles of crop pest control (b) recommend appropriate principles of crop pest control				10

TOPIC/SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEARNING STRATEGIES	TEACHING/LEARNING RESOURCES	ASSESSMENT	ESTIMATED NUMBER OF PERIODS
7.0 PLANT BREEDING 7.1 Introduction to Plant Breeding	By the end of this sub topic the student should be able to: (a) explain the meaning of plant breeding	(i) The teacher to lead students in groups to brainstorm on the meaning of plant breeding (ii) Students to summarize groups' deliberations and present (iii) The teacher to give a concluding remark on the meaning of plant breeding.	<ul style="list-style-type: none"> • flip charts • marker pens • manila sheets 	Is the student able to explain the meaning of plant breeding?	4
	(b) describe major objectives of plant breeding	(i) The teacher to lead students in groups to discuss objectives of plant breeding (ii) Students to summarize the group deliberations and present (iii) The teacher to give concluding remarks on major objectives of plant breeding.	<ul style="list-style-type: none"> • flip charts • marker pens • manila sheets 	Is the student able to describe major objectives of plant breeding?	
7.2 Methods of Plant Breeding	By the end of this sub topic the student should be able to: (a) explain the relationship between reproductive systems in crops and plant breeding methods	(i) The teacher to display, pictures or video that shows reproductive systems in cultivated plants (ii) The teacher to guide students in groups to discuss the relationship between reproductive systems in crops and breeding methods	<ul style="list-style-type: none"> • flip charts • marker pens • manila sheets • pictures 	Is the student able to explain the relationship between reproductive systems in crops and plant breeding methods?	30
	(b) describe plant breeding methods	(i) The teacher to display, pictures or video that describe various plant breeding methods. (ii) The teacher to guide students in groups to discuss breeding methods in relation to distinct plant reproductive systems	<ul style="list-style-type: none"> • flip charts • marker pens • manila sheets • pictures 	Is the student able to describe plant breeding methods?	
	(c) apply appropriate plant breeding methods for crop improvement	(i) Students in groups to discuss on appropriateness of plant breeding methods for various crops with emphasis to sustainable crop improvement. (ii) Teacher to let students to present their groups' deliberations	<ul style="list-style-type: none"> • flip charts • marker pens • manila sheets 	Is the student able to apply appropriate plant breeding methods for crop improvement?	

TOPIC/SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEARNING STRATEGIES	TEACHING/LEARNING RESOURCES	ASSESSMENT	ESTIMATED NUMBER OF PERIODS
8.0 ENVIRONMENTAL AND TECHNOLOGICAL CHALLENGES IN AGRICULTURAL DEVELOPMENT	By the end of this sub topic the student should be able to: (a) explain the meaning and concept of Genetically Modified Organisms (GMOs) (b) assess the importance of (GMO) in agricultural production	(i) The teacher to lead students to brainstorm the concept of genetically modified organisms (GMOs) (ii) The teacher to invite an expert (iii) The teacher to use video/slides show to familiarize students with GMOs technology	<ul style="list-style-type: none"> • flip charts • marker pens • manila sheets • video • slides 	Is the student able to explain the meaning and concept of Genetically Modified Organisms (GMOs)?	10
8.1 Introduction to Genetically Modified Organisms		(i) Students in groups to assess the importance of GMOs in agricultural production with emphasis to merits and demerits of GMOs (ii) The teacher to guide students to present the groups' deliberations (iii) The teacher to invite an expert	<ul style="list-style-type: none"> • flip charts • marker pens • manila sheets • video • slides 	Is the student able to assess the importance of (GMO) in agricultural production?	
8.2 Introduction to Organic Farming	By the end of this sub topic the student should be able to: (a) explain the meaning of organic farming (b) evaluate the importance of organic farming	(i) The teacher to lead students in groups to brainstorm the meaning of organic farming (ii) Teacher to guide students to summarize their group deliberations on flip charts or manila sheets for presentation (iii) The teacher to give concluding remarks on the meaning of organic farming.	<ul style="list-style-type: none"> • flip charts • marker pens • manila sheets • video • slides 	Is the student able to explain the meaning of organic farming?	10
		(i) The teacher to lead students to brainstorm on principles of organic farming (ii) The teacher to lead students in groups to evaluate the importance of organic	<ul style="list-style-type: none"> • flip charts • marker pens • manila sheets • video • slides 	Is the student able to evaluate the importance of organic farming?	

TOPIC/SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEARNING STRATEGIES	TEACHING/LEARNING RESOURCES	ASSESSMENT	ESTIMATED NUMBER OF PERIODS
8.3 Agricultural Activities and Sustainable Agricultural Development		farming with emphasis to its merits and demerits (iii) The teacher to invite an expert			
	By the end of this sub topic the student should be able to: (a) explain meaning and importance of sustainable agricultural production	(i) Students in groups to brainstorm on the meaning and importance of sustainable agricultural production (ii) The teacher to lead students to summarize their group deliberations and present them for discussion by the class (iii) The teacher to give clarifying and concluding remarks on the meaning and importance of sustainable agricultural production	<ul style="list-style-type: none"> • flip charts • marker pens • manila sheets • pictures 	Is the student able to explain meaning and importance of sustainable agricultural production?	20
	(b) outline the threats to sustainable agricultural production	(i) The teacher to guide students in groups to discuss the threats, namely deforestation, green house effect, pollution, overgrazing and human settlement (ii) The teacher to arrange site visits for students so that they appreciate the threats	<ul style="list-style-type: none"> • flip charts • marker pens • manila sheets • pictures • Various targeted sites 	Is the student able to outline threats to sustainable agricultural production?	
	(c) describe appropriate strategies for sustainable agricultural production	(i) The teacher to brainstorm with students on the unsustainable agricultural production practices using pictures, video tapes or visiting the sites (ii) The teacher to guide students in groups to describe the appropriate strategies for sustainable agricultural production and present their deliberations for discussion by the class	<ul style="list-style-type: none"> • flip charts • marker pens • manila sheets • pictures • Various targeted sites 	Is the student able to describe appropriate strategies for sustainable agricultural production?	
	(d) apply environmentally friendly strategies for sustainable agriculture	(i) The teacher to display pictures or slides/video or visit the sites for students to appreciate various strategies for sustainable agriculture (ii) Students to participate in group	<ul style="list-style-type: none"> • flip charts • marker pens • manila sheets • pictures • video 	Is the student able to apply environmentally friendly strategies for sustainable	

TOPIC/SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEARNING STRATEGIES	TEACHING/LEARNING RESOURCES	ASSESSMENT	ESTIMATED NUMBER OF PERIODS
9.0 INTRODUCTION TO AGRICULTURAL PRICES	By the end of this sub topic the student should be able to: (a) explain the meaning and types of agricultural prices	discussion and presentation on the application of environmentally friendly strategies like limited use of industrial chemicals, afforestation, use of green manure and mulching (i) In question and answer sessions students to explain the meaning and importance/functions of prices and agricultural prices (ii) The teacher to guide students in groups to explain the types of agricultural prices with emphasis to market prices, prices at factor costs and import/export parity prices (iii) The teacher to lead students to summarize groups' deliberations on flip charts/ manila sheets and present them to the class for discussion (iv) The teacher to make concluding remarks on meaning and types of agricultural prices	<ul style="list-style-type: none"> slides flip charts marker pens manila sheets text and reference books 	agriculture?	15
9.1 Meaning and Types of Agricultural Prices	(b) outline the types of agricultural price fluctuations (c) describe causes and control of agricultural price fluctuations	(i) The teacher to lead students to brainstorm on the meaning of price fluctuation (ii) The teacher to let students in groups to discuss types of agricultural price fluctuations and present them in a gallery walk (iii) The teacher to make concluding remarks on the types of agricultural price fluctuations. (i) Teacher to lead students in groups to describe the causes and then control of agricultural price fluctuations (ii) The teacher to guide students to summarize the group deliberations and present them to the class. (iii) The teacher to make concluding remarks on the causes and control of	<ul style="list-style-type: none"> Flip charts manila sheets marker pens figures and illustrations Flip charts manila sheets marker pens figures and illustrations 	Is the student able to outline the types of agricultural price fluctuations? Is the student able to describe the causes and control of agricultural price fluctuations?	

TOPIC/SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEARNING STRATEGIES	TEACHING/LEARNING RESOURCES	ASSESSMENT	ESTIMATED NUMBER OF PERIODS
9.2 Introduction to Agricultural Marketing	By the end of this sub-topic the student should be able to: (a) explain the meaning of agricultural marketing	agricultural price fluctuations. (i) The teacher and students to brainstorm the meaning of agricultural marketing (ii) The teacher to summarize the main ideas on the meaning of agricultural marketing and give the concluding remarks	<ul style="list-style-type: none"> • flip charts • marker pens • manila sheets 	Is the student able to explain the meaning of agricultural marketing?	20
	(b) describe approaches to the study of agricultural marketing	(i) The teacher to lead students in groups to describe approaches to study of agricultural marketing (ii) The teacher to guide students to summarize the groups' deliberations on flip charts/ manila sheets and present them to the class (iii) The teacher to make concluding remarks on approaches to the study of agricultural marketing with emphasis to commodity, institutional and behavioural approaches	<ul style="list-style-type: none"> • flip charts • marker pens • manila sheets • text books • reference books 	Is the student able to describe approaches to the study of agricultural marketing?	
	(c) explain the concepts of marketing margins, costs and efficiency	(i) Teacher to lead students in questions and answers session to explain the concept of marketing margins (ii) The teacher to lead students in groups to explain the concept of marketing costs with emphasis to identification of marketing costs and factors influencing the farmers' share of the final consumer price (iii) Students in groups to explain marketing efficiency both economic and technical efficiency, summarize them on flip charts or manila sheets and then present them to the class (iv) The teacher to guide students to undertake market survey of product(s) of choice so that they appreciate market margins, costs and efficiency (v) The teacher to guide students to prepare reports of the market survey.	<ul style="list-style-type: none"> • flip charts • marker pens • manila sheets • text books • reference books • marketing participants 	Is the student able to explain the concepts of marketing margins, costs and efficiency?	

TOPIC/SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEARNING STRATEGIES	TEACHING/LEARNING RESOURCES	ASSESSMENT	ESTIMATED NUMBER OF PERIODS
	(d) implement marketing principles for profit maximization	(i) Students in groups to discuss how to implement marketing principles for profit maximization (ii) The teacher to lead students to summarize the groups deliberations and then present them to the class (iii) The teacher to make concluding remarks on how to use marketing principles for profit maximization.	<ul style="list-style-type: none"> • flip charts • marker pens • manila sheets • text books • reference books 	Is the student able to implement marketing principles for profit maximization?	
10.0 FUNDAMENTALS OF INTERNATIONAL TRADE	By the end of this sub topic the student should be able to: (a) explain the meaning and objectives of international trade	(i) The to lead students to brainstorm on the meaning of international trade (ii) Teacher to let students in pairs to explain objectives of international trade (iii) The teacher to guide students to write main ideas on flip charts or manila sheets for plenary (iv) The teacher to give concluding remarks on the objectives of international trade with emphasis to the law of comparative advantage and opportunity cost	<ul style="list-style-type: none"> • flip charts • marker pens • manila sheets • text books • reference books 	Is the student able to explain the meaning and objectives of international trade?	06
10.1 Introduction to International Trade	(b) describe balance of payment and foreign reserves	(i) The teacher and students to brainstorm on balance of payments and foreign reserves (ii) The teacher to lead students in groups to discuss the importance of balance of payment and foreign reserves (iii) The teacher to guide students to summarize the groups' deliberations on flip charts/manila sheets and then present them to the class (iv) The teacher to make concluding remarks on the balance of payment and foreign reserves.	<ul style="list-style-type: none"> • flip charts • marker pens • manila sheets • text books • reference books 	Is the student able to describe balance of payment and foreign reserves?	

TOPIC/SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEARNING STRATEGIES	TEACHING/LEARNING RESOURCES	ASSESSMENT	ESTIMATED NUMBER OF PERIODS
10.2 International Financial Institutions	By the end of this sub-topic the student should be able to: (a) explain the role of international financial institution to agricultural production	(i) The and students to brainstorm on examples of International financial institutions such as World Bank and IMF. (ii) The teacher to lead students in groups to point out roles and impact of international financial institutions in agricultural production (iii) The teacher to guide students to summarize the groups' deliberations and then present them to the class (iv) The teacher to make concluding remarks on roles and impact of international financial institutions.	<ul style="list-style-type: none"> • flip charts • marker pens • manila sheets • text books • reference books 	Is the student able to explain the role of international financial institution to agricultural production?	5
11.0 INTRODUCTION TO SOIL. CHEMISTRY	By the end of this sub-topic the student should be able to: (a) describe chemical and mineralogical composition of the soil	(i) The teacher to lead students in groups to brainstorm on the chemical and mineralogical composition of the soil with emphasis to main distinct groups of minerals namely primary and secondary minerals (ii) By using pictures, models, video, and other illustrations the teacher to guide students in groups to describe the chemical and mineralogical composition of the soil (iii) The teacher to give clarifying and concluding remarks on chemical and mineralogical composition of the soil with emphasis to major chemical elements namely silicates, aluminium, iron, calcium	<ul style="list-style-type: none"> • Models • pictures • manila sheets • marker pens • text books • reference books 	Is the student able to describe chemical and mineralogical composition of the soil?	20
11.1 Chemical Properties of Soil	(b) outline the properties of soil colloids	(i) The teacher to guide a question and answer session so as to outline the types of soil colloids and their properties (ii) The teacher to summarize and clarify the types of soil colloids and their properties (iii) The teacher to guide students to	<ul style="list-style-type: none"> • soil samples • flip charts • marker pens • manila sheets • laboratory 	Is the student able to outline the properties soil colloids?	

TOPIC/SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEARNING STRATEGIES	TEACHING/LEARNING RESOURCES	ASSESSMENT	ESTIMATED NUMBER OF PERIODS
	(c) explain the meaning and types of soil reaction	perform an experiment to determine the colloidal properties of the soil (i) The teacher and students to brainstorm the concept of soil reaction (ii) The teacher to guide students in groups to discuss and then present the types of soil reaction (iii) The teacher to give concluding remarks on the meaning and types of soil reaction (iv) The teacher to guide students to perform an experiment to determine soil reactions using pH meter and soil test kit	<ul style="list-style-type: none"> • flip charts • marker pens • manila sheets • soil test kits • pH meters • soil samples • laboratory 	Is the student able to explain the meaning of soil reactions?	
	(d) outline methods of correcting soil reaction	(i) The teacher to guide students in a brainstorming session to outline methods of correcting soil reaction with emphasis to liming, and reclamation of saline and acidic soils (ii) The teacher to guide students to do practicals on correcting soil reaction (iii) Teacher to lead students to present the practical results	<ul style="list-style-type: none"> • flip charts • marker pens • manila sheets • soil test kits • pH meters • liming materials • soil samples 	Is the student able to outline the methods of correcting soil reaction?	
11.2 Plant Nutrition and Soil Fertility	By the end of this sub topic the student should be able to: (a) explain the meaning of plant nutrient elements (b) name and categorize essential mineral elements in the soil	(i) The teacher to lead students to brainstorm on meaning of plant nutrient element (ii) The teacher to summarize the meaning of plant nutrient elements (i) The teacher to lead question and answer session whereby students will name and categorize essential mineral elements in the soil in relation to common plant requirements (ii) The teacher to guide students in groups to discuss, summarize and present their deliberations on naming and categorization of essential mineral elements in the soil using VIPP cards or flip charts	<ul style="list-style-type: none"> • flip charts • marker pens • text and reference books • flip charts • marker pens • VIPP cards • Text and reference books 	<p>Is the student able to explain the meaning of plant nutrient elements?</p> <p>Is the student able to name and categorize essential mineral elements in the soil?</p>	20

TOPIC/SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEARNING STRATEGIES	TEACHING/LEARNING RESOURCES	ASSESSMENT	ESTIMATED NUMBER OF PERIODS
	(c) outline basic functions of the selected essential mineral elements in plants	(i) The teacher to guide students to outline the basic functions of selected essential mineral elements, namely N, P, K, Ca, Mg, and S through library search (ii) The teacher to guide students to discuss, summarize and present their deliberations on basic functions of essential mineral elements in plants using VIPP cards or flip charts	<ul style="list-style-type: none"> • flip charts • marker pens • VIPP cards • Relevant text and reference books 	Is the student able to outline basic functions of the selected essential mineral elements in plants?	
	(d) distinguish deficiency symptoms of the selected essential mineral elements	(i) The teacher and students to participate in a brainstorming session to narrate deficiency symptoms of selected essential mineral elements, namely N, P, K, Ca, Mg and S (ii) The teacher to guide students to collect plant samples (normal and deficient samples) (iii) The teacher to lead students in groups and guide them to distinguish deficiency symptoms of main mineral elements namely N, P, K, Ca, Mg and S using the collected samples	<ul style="list-style-type: none"> • Plant samples • Pictures 	Is the student able to distinguish deficiency symptoms of the selected essential mineral elements?	
	(e) explain sources of the nutrient elements and nutrient uptake in plants	(i) The teacher to lead students in questions and answers session to explain various sources of macro and micro nutrients also explore the form(s) in which each nutrient element is absorbed by plants (ii) The teacher to lead students in groups to discuss the uptake of nutrients from the soil and through foliage as well as factors affecting nutrient absorption in plants (also covering transport of nutrients within the plant) (iii) The teacher to guide students to summarize and present their deliberations on VIPP cards, flip charts or manila sheets	<ul style="list-style-type: none"> • Relevant text and reference books • flip charts • manila sheets • marker pens • VIPP cards • Laboratory • Pot plants 	Is the student able to explain sources of the nutrient elements and nutrient uptake in plants?	

TOPIC/SUB-TOPIC	SPECIFIC OBJECTIVES	TEACHING/LEARNING STRATEGIES	TEACHING/LEARNING RESOURCES	ASSESSMENT	ESTIMATED NUMBER OF PERIODS
11.3 Soil Conservation and Maintenance of Soil Fertility		(iv) The teacher to prepare and guide students to conduct an experiment to verify nutrient element uptake in plants and how it is affected by some factors as studied in (ii) above			
	By the end of this sub topic the student should be able to: (a) explain the meaning of soil fertility, productivity and soil conservation	(i) Teacher and students to brainstorm on the meaning of soil fertility, productivity and soil conservation (ii) The teacher to summarize ideas of meaning of soil fertility, productivity and soil conservation on flip charts or manila sheets for discussion	<ul style="list-style-type: none"> • flip charts • marker pens • manila sheets 	Is the student able to explain the meaning of soil fertility, productivity and soil conservation?	20
	(b) describe causes of loss of soil and soil fertility	(i) Using pictures, video, relevant sites and other illustrations, teacher to lead the students to observe and then describe the causes of loss of soil and soil fertility status of the soil (ii) The teacher to guide students to summarize their deliberation and present them to the class for discussion	<ul style="list-style-type: none"> • flip charts • marker pens • manila sheets • pictures (video, slides, still pictures) • relevant sites 	Is the student able to describe causes of loss of soil and soil fertility?	
	(c) recommend methods of maintaining and improving soil fertility and plant nutrition	(i) The teacher to lead students in groups to discuss and present the appropriate methods of maintaining and improving soil fertility with emphasis to sustainability of each method (ii) The teacher to give concluding remarks on recommended methods of maintaining and improving soil fertility and plant nutrition	<ul style="list-style-type: none"> • Industrial fertilizer • Organic manures • Pictures (video, slides, power point, still pictures) 	Is the student able to recommend methods of maintaining and improving soil fertility and plant nutrition?	



Printed by: Business Printers Ltd, 16 Lugoda Street Gerezani Industrial Area.
P.O. Box 78495, Dar es salaam, Tel: (22) 2134060/2134062